University of Alberta

Experiences of Instructors in Graduate-level Computer-mediated Learning Environments

by

David George Annand ©

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment
of the requirements for the degree of Doctor of Education

Department of Educational Policy Studies

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Box 39
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University of Alberta

Faculty of Graduate Studies and Research

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled Experiences of Instructors in Graduate-level Computer-mediated Learning Environments submitted by David George Annand in partial fulfillment of the requirements for the degree of Doctor of Education.

Dr. D. Collett (chair)

M. Haughey

Dr. M. Haughey (supervisor)

Dr. J. da Costa

Dr. R. Garrison

T Anderson

Dr. T. Anderson

J Ross-Kerr

Dr. J. Ross Kerr

Dr. E. Burge

May 15, 1998

Date approved by committee

ABSTRACT

This study uses naturalistic enquiry to illuminate and richly describe the instructional experiences of six CMC instructors in two graduate-level programs at a distance-based Canadian university. It also provides insight into the participants' motivations and understandings of adult and distance education processes. Two in-depth, unstructured interviews were conducted with each of the instructors between April and August, 1996. Interpretation of the interview transcripts identified several differences in instructors' perspectives, primarily regarding CMC communication processes, instructional techniques employed in the medium, and the effect of CMC on instructional practice.

These differences suggested that fundamentally different educational philosophies significantly affected instructors' perceptions of the CMC environment. Two instructors appeared to consider learning to be more of a "within-learner" process, informed by behavioural and cognitive learning theories, where knowledge is acquired through interaction with an objective world. Learner needs of independence and self-directedness tended to be emphasized. These instructors viewed printed instructional materials and assignments as more important means of student learning. Computer conference participation was somewhat de-emphasized. The remaining instructors viewed learning more as an "among-learner" process informed by constructivist or dialectical learning theories. These instructors tended to provide more collaborative learning experiences to facilitate group knowledge construction processes and to reward computer conferencing activities more than the other two instructors.

However, respect for individual learner needs and learning styles, personal time constraints of instructors, differing levels of instructional expertise and technical competence, and problematic characteristics of the electronic learning environment like the discursive nature of CMC interaction, response delays, and lack of non-verbal cues

also appeared to affect the instructional practices of all the instructors. Diverse yet equally defensible views about appropriate CMC instructional practices can be entertained if these underlying perspectives and moderating influences are taken into account.

Two larger organizational issues may also affect the experiences of participants in this study. First, dedicated distance education institutions may tend to propagate dominant learning theories through the text production processes generally used in both traditional (print-based) and asynchronous, electronic forms of distance education.

Second, the CMC-based learning models undergirding the two graduate programs in this study result from a somewhat unique combination of circumstances. The tendency of these learning models to increase the cost of instruction may impede the development of newer forms of electronic distance learning like CMC, particularly in undergraduate programs, unless new learning models are developed which encourage unstructured and student-prompted interaction, enable instructors to intervene more selectively in the interactions of participants, and generally provide increased amounts of student support without direct instructor involvement.

These organizational issues may provide some of the more significant challenges for distance-based universities as they proceed into the next millennium.

This dissertation is dedicated to my father, George Annand and to my mother, Bessie Ellis, M.Ed., the quintessential adult learner.

ACKNOWLEDGMENTS

I initially undertook this research at the suggestion of my supervisor, Dr. Margaret Haughey. I would like to thank her for pointing me in this direction, guiding me through the dissertation process, and providing advice and encouragement along the way. I would also like to thank my committee members for their input.

Learning from the experiences of the instructors in this study has been a worthwhile endeavour. Second-hand experience is often the best, and I would like to thank the instructors for sharing with me their insights, thoughts, suggestions – and especially their valuable time.

Finally, I would like to acknowledge my wife Gerry and our children for their support and understanding during my research. They provided me with constant reminders that a dissertation is not the most important thing in life.

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Chapter 1

INTRODUCTION AND DESCRIPTION OF THE STUDY

This study uses naturalistic enquiry to explore the instructional experiences of six computer-mediated communication (CMC) instructors[1] in two graduate-level programs at a distance-based Canadian post-secondary institution. My interest in CMC evolved from my experiences as an instructor at this institution. I left public accounting practice in 1987, and taught as a sessional accounting instructor in the Faculty of Business at a large campus-based university for two years. I had been exposed to traditional lecturing throughout my university and professional career, so I had a fairly good idea of what was expected of a classroom instructor.

In 1989, I accepted a position as assistant professor of accounting at my present institution. I was plunged into the world of distance education – a world quite different from any that I had experienced previously. I was unsure what distance education was about, but there were some pleasant aspects. I was more independent and no longer had to be at a certain place at a certain time to perform my duties.

Like a few of my relatives and friends still do, though, I asked myself, "What is it that distance educators actually do?" I soon began to understand. As a sessional instructor, I had been used to handling a few hundred students at most over the course of two academic terms per year, a few cohorts at a time, with the students proceeding in relatively pre-determined, lock-step fashion. Now, I was responsible for about 1,200 students per year, who could start studying at various points throughout the year and proceed at their own pace through my courses. I no longer needed to spend time preparing for lectures, but I had to be prepared to answer questions about any aspect of a course when the telephone rang. I didn't have to lecture for an hour or two at a time, but now I had to figure out how to teach something, primarily through printed material, to someone I would never see nor speak with face-to-face.

---

[1] One of the participants objected to the use of the term "instructor" to describe the role of the computer conference leader. However, this term has been used throughout the study to reflect the term most commonly used among the participants to describe themselves.

I was also no longer solely responsible for the development and presentation of learning material as I had been in my rather insulated classroom. To get things done I had to work with instructional designers, graphic artists, production and course material people, library staff, tutors, markers, subject matter experts, book publishers, copyright officers, educational techno-wizards, budget officers, union reps, registry personnel, lawyers, and computer system administrators.

Mostly, though, I missed the face-to-face classroom contact with my students. Now, I just heard student voices at the other end of a telephone line. But these were appealing voices, in many ways – voices of mature people who were often tired because they had to devote significant amounts of energy to other responsibilities like families and full-time work, but who kept plugging away at their course work at the kitchen table late at night after the kids were in bed. Voices of people in Frobisher Bay and Aetna, who wanted a post-secondary education without having to pull up stakes and move away from their communities. Voices of people in prison. Voices of people who needed more time to complete their course work because the kids were sick, or they had to move, or their spouse had died. Voices of those voluntarily engaged in a struggle. Voices of adults in the true sense of the word.

I began to understand that I wasn't primarily a distance educator now but rather an adult educator. My students were different in many ways from the students I had taught before who were usually under 21 years of age and had not yet experienced many hallmarks of adulthood such as full-time work, marriage, and raising children.

Their voices changed me. I began to wonder if I had ever "taught" anything at all, even in a classroom. Perhaps, in some small way, I had just helped people to learn something about themselves and their world that I may or may not have intended, through a process that was unique for each learner and in many ways unknowable.

My understanding of education was also being changed by computer-mediated computer (CMC) technologies like computer conferencing, which was gradually being introduced at my educational institution during this time. I had limited experience using this technology, and I felt I needed to understand more about this environment for "external" reasons - I wanted to use the technology appropriately, and I thought that the study would be useful to me in my everyday working life as a distance educator, to others involved in distance education, and to my academic career. It was not until the study was almost completed that I realized the "internal" benefits. Now I know more about the diversity of perceptions of the adult education process and how these perceptions inform actions. The instructors in this study and the research literature have helped me to understand not only more about some of the educational aspects of computer-mediated communication, but also about the complexities of adult, distance learning and instruction. I think I am a little wiser. And I think that I can tell people more about what I do next time they ask.

> We shall not cease from exploration
> And the end of all our exploring
> Will be to arrive where we started
> And know the place for the first time.
>
> T.S. Eliot

The Computer-mediated Communication Environment

Mason (1990) defined computer-mediated communication as

> the set of possibilities which exist when computers and telecommunications networks are used as tools in the communications process to compose, store, deliver and process communication. Such systems rely on a basic configuration of a [host] computer with appropriate software, connected via telephone and data networks to users with terminals or micro-computers. (p. 221)

Learners in a formal CMC-based educational environment use computer hardware and software and modems or Internet connections to participate in text-based, generally multi-participant dialogue at times and places that are convenient for them. This electronic communication usually takes place asynchronously; that is, contributions by some participants may not be read or responded to by others for a few hours or days. Learners can participate in a variety of activities, like electronic discussions, question and answer exercises, or other group activities for part or all of an applicable course. They can also communicate privately with their instructors or other learners, and can transfer assignments and other data electronically. CMC is distinct from other types of electronically-enhanced distance learning experiences like video and audio conferencing, which use electronic technology to provide same-time (synchronous), multiple-point communication among learners.

Mason (1994), Collins and Berge (1995), and Haughey and Anderson (1998) classified CMC into three components.

1. *Electronic mail* generally provides one-to-one asynchronous, text-based messaging among remote users. Digital audio-visual capabilities are increasingly common.

2. *Computer conferencing* provides for small- or large-group electronic communication. Key features for participants include the ability to take part in organized on-line discussions, which are essentially a group of messages relating to a common theme. "Moderators" (usually the course instructors) have the ability to monitor and control conference activities. For instance, they start and end conferences and establish other conferences so emerging topics can be discussed. They usually control levels of access to the conferences for various classes of participants.

3. *Informatics* or Internet resources provide access to sources of organized data at the host or remote institutions (e.g., World Wide Web home pages, on-line library catalogues, and archive sites for various types of print, audio, or video media), or on-line search tools.

Within the CMC environment, computer conferences in particular can facilitate group-based and time- and place-independent learning. Eastmond (1995) identified the structural characteristics of computer conferencing as: (a) *branching*, or the ability to concurrently discuss related sub-topics in a separate conference as discrete conversations; (b) *threading*, or the ability to relate current conference messages to prior ones; (c) *profiling*, or the ability to graphically interpret and represent the structure of various conferences and sub-conferences to a participant, and, in some cases, to provide some background information about conference participants; (d) *review*, or the ability to re-examine conversations by topic within a conference; and (e) *powers*, or the ability of the instructor (in most cases) to control levels of access to computer conference features by imposing read-only restrictions or limiting participants' abilities to modify or delete messages, for instance (p. 13).

Rationale for the Study

Mason (1992), who has written extensively on CMC, noted that much of the research on CMC environments has not contributed to our understanding of the pedagogical aspects of this form of instruction. She stated that most research on educational applications of computer-mediated communication consisted of descriptions of actual applications, or comparison of learning outcomes using computer conferences and other types of instruction, generally classroom-based interaction. In general, findings from within more traditional research paradigms which evaluated measures of "success," "learning," and "educational exchange" were often viewed as more objective. She pointed out, however, that this approach was problematic. Only questions most conducive to investigation by conventional research methods were studied. Findings arising from these questions were then assumed to constitute the whole educational experience.

Burge (1994) argued that

> for the current stage of distance education . . . we ought also to research what happens "on the ground." That is to say, we need to study the conditions, events, and consequences as experienced by learners and ourselves as practitioners. When such enquiry uses the naturalistic paradigm, with its qualitative methods to generate rich descriptions of various phenomena (Denzin and Lincoln, 1994), we may increase our understanding of people's experience with one important area of distance education, that is, the use of communications technologies. (p. 20)

In researching learners in a CMC environment at a U.S. college, Eastmond (1995) also found that generalizations about adult distance learning based on the literature were difficult to make because these studies had usually employed rationalistic, objective types of research, with pre-defined research frameworks. This structure, he suggested, prevented important, previously-unreported themes about the field, or issues that the participants consider to be personally meaningful, from being uncovered through dialogue and exploration with the participants. For instance, surveys, questionnaires, and short, one-time interviews used within a rationalistic research design often prevented the observer from establishing rapport with the participants, and in some senses did not provide useful information because of the superficial nature of the data gathered, the lack of systematic analysis, and the limitations imposed by the research design which prevented issues from being probed in-depth. Further, rationalistic research designs generally focused on psychological variables or narrowly-defined personal attributes, and did not attempt to gather these insights directly from the richly-described experiences of the participants. They obtained only limited information about the participants, their motivations, and underlying values and beliefs which may have shaped their understandings (pp. 188-189). Consequently, Eastmond advocated a constructivist orientation to describe computer conference experiences from the point of view of learners. In originally proposing this type of study, he stated,

> In sum, what has been needed [is a] probing examination of adult distance students using computer conferencing, using multiple types of qualitative data, that endeavor to "thickly describe" these students' . . . points of view. (p. 189)

This research has been undertaken because the need for a probing examination and thick description of emerging themes and issues that are personally-meaningful to participants appears to apply equally to instructors in the CMC learning environment at this time.

Purpose of the Study

This study uses naturalistic enquiry to explore the experiences of six CMC instructors and identify issues that appear relevant to research in this field. Specifically, the primary research question is, "What are the experiences of instructors in CMC learning environments?"

To provide a tentative framework for exploring this question, I developed a three-part conceptualization of the instructional experience: participant understanding of self as instructor, of learners, and of the CMC educational process. I developed initial, exploratory questions within each part to guide my own understanding of the topic and provide a potential source of questions for my interviews.

Understanding of Self as Instructor

1. What personally motivates the instructors to participate in CMC learning environments?

2. What are the instructors' understandings of their more important functions in the CMC environment?

3. How does CMC affect the instructors' teaching styles compared to other distance education or classroom experiences? For example, is it easier or more difficult to teach a CMC-based course? Do the instructors pose more questions? Do they tend to dominate "class" time as extensively? Do computer conferences require instructors to pay more attention to instructional design issues?

4. What are the workload requirements of CMC-based courses, and how do the instructors balance these demands with other duties?

5. What are some notable teaching and learning successes they have experienced in the CMC environment? What contributed to these? What are some notable failures? What did the instructors learn from these?

6. How has the CMC instructional experience changed the instructors' views of themselves as educators?

Instructor Understandings of Learners

1. How do the instructors communicate effectively with their students?

2. How does CMC limit or enhance the learner and instructor relationship compared to other forms of distance education, or classroom-based teaching?

3. To what extent do learners interact with each other in computer conferences? What are the perceived advantages and disadvantages of peer interaction?

Instructor Understandings of the CMC Educational Process

1. What are the instructors' educational objectives for their courses? Would these be different if CMC was not used?

2. How do the instructors determine whether learning takes place?

3. What strategies do the instructors use to control or guide interaction? For instance, is participation mandated? Does the extent of participation significantly determine a student's final mark in the course? How are learners discouraged from monopolizing the on-line discussions or encouraged to participate more? How are learners encouraged to improve the quality of their responses? How do instructors identify and diagnose participation problems? How are these problems resolved?

4. How are guidelines for respective responsibilities of the instructor and learners established?

5. How do the instructors assess the level and value of individual participants' contributions to the conference?

6. How do the instructors gauge their own responses to questions? In other words, when do instructors choose to intervene or remain silent, to respond immediately or delay? How do instructors establish the right balance of feedback in terms of quality, length and tone?

7. Does CMC democratize the learning process because of the ability of learners to engage the instructor and each other in conversation more easily than in a structured classroom setting? If so, how does this affect the instructional experience?

Since the study employed an emergent research design, important issues were also identified in the course of the research that had not been anticipated in the preliminary questions noted above. These issues were explored further during the research process and are discussed later as part of the study's findings.

Summary

This study explores the instructional experiences of six CMC instructors at a distance-based Canadian post-secondary institution through a process of naturalistic enquiry. Prior to undertaking the study, it was anticipated that the experiences of the instructors would relate primarily to three broad categories of understanding – that of self as instructor, learners, and the educational process. Because the research design of naturalistic enquiry is emergent, additional, important areas of interest arose from the instructors' own descriptions and my reflections on their experiences.

Aspects of naturalistic enquiry and details about the study's research design are discussed in chapter 3. The instructors' accounts are described in chapter 4, and discussed and interpreted in chapter 5. Chapter 6 summarizes the study, discusses some of the lessons I learned from this research process, and suggests some directions for future research.

Various characteristics of the CMC environment have also been briefly described in this chapter. The literature review in the next chapter provides more background about the theory and practice of computer-mediated communications, and contextualizes the educational aspects of the medium by describing related areas of adult and distance education which influence it.

Chapter 2

LITERATURE REVIEW

The evolution of distance education theory has significantly influenced the understanding of CMC as an educational medium. In this chapter, relevant research literature in the related areas of adult and distance education as well as research focusing on certain areas of computer-mediated communication will be reviewed to provide background and context for the study.

Characteristics of Adult Distance Education

Garrison (1989) considered that the foundational work of distance education research did not start until the 1970s. However, Holmberg (1986) noted that various forms of distance education have existed for centuries and that modern correspondence study (meaning print-based study by mail) has existed for over 150 years, pre-dating free public education. Similarly, Kaye (1989) considered that the advent of modern correspondence study began in Britain about 1840, with the advent of the postage stamp and a national mail system (p. 18).

The term *distance education* has come to subsume the term *correspondence study* as communication technologies like radio, telephone, television, and computers have significantly supplemented or replaced mail systems. These media provide a variety of methods for educating learners removed in time or place from their instructors and educational institutions, and some or all of their peers.

Garrison (1989) stated that the hallmarks of both adult and distance education are their abilities to adapt to new social needs and include elements of the population that other forms of education cannot reach. He described how the growth in correspondence study correlated with periods of economic transition and change – rapid urbanization, industrialization and the disruptive effects of war during the early 1900s, the Depression of the 1930s, and the years of growth immediately following the Second World War. During these periods, many adults sought to improve their socioeconomic status through further education, and required flexible educational approaches to accomplish this.

As Garrison noted, "The majority of distance education is concerned with meeting the educational needs of adults" (p. 103). Burge (1988) also argued that the overwhelming proportion of distance education is directed at adults. Thus, the incorporation of adult learning literature appears necessary to provide context for the research conducted in this study.

Self-directedness in Adult Learners

Of all adult learning concepts, that of self-directedness has received perhaps the most emphasis (MacKeracher, 1996; Candy, 1991). One major proponent has been Knowles (1970, 1983). Knowles (1983) delineated the principal concepts which distinguished andragogy (instructional practices for adults) from pedagogy:

1. adults are capable of being self-directed learners, and are not dependent personalities;
2. adults accumulate experiences that provide significant resources for learning;
3. adult willingness to learn is associated with requirements to perform social roles;

4. adults are more focused on present, rather than postponed, application of acquired knowledge. (p. 55)

Knowles did not subscribe to the view that adult learning was essentially the transmission of knowledge by effective teaching practices. Rather, he viewed learning as a cooperative process between instructor and student, but controlled by the adult learner, and an essentially internal activity which engaged the learner's emotional, intellectual, and physiological being. Instructors needed to facilitate this process, as well as build relationships of mutual trust and assistance among learners and between learners and the instructor, whom Knowles regarded as a co-learner (p. 67).

In his view, adults perceived learning to be worthwhile to the extent that it assisted them in achieving some personal goal. Adults made use of relevant resources (including instructors) to the extent that these contributed to the achievement of these goals. As a result, he believed that adult learners needed to be self-directed to be effective. They should (a) diagnose their own learning needs, (b) formulate their own learning objectives, (c) share responsibility for developing and accomplishing learning activities, and (d) assess the extent to which their learning objectives are achieved (p. 68).

In a recent comprehensive review of adult learning, MacKeracher (1996) pointed out that

> self-directedness can be understood in three ways:
> 1. as an innate disposition, trait, or characteristic one is born with;
> 2. as an acquired quality developing naturally with increasing age, and/or
> 3. as a learned characteristic encouraged through educational activities. (p. 51)

She goes on to point out some conceptual difficulties associated with self-directed learning – the assumption that all adults value self-directedness, for instance – and concludes by listing facilitating principles based on three conceptualizations:

1. If self-directedness is considered an individual character trait, then "self-directedness in learning is facilitated when opportunities are provided in which learners can: conceive goals and plans, exercise freedom of choice, use rational reflection, follow through on planned activities, assess goals, plans, choices and activities, and exercise self-discipline." (p. 58)

2. If self-directedness is considered to be acquired with age, then "self-directedness is facilitated when learners are assisted how to learn." (p. 58)

3. If self directedness is considered to be a learned characteristic, then "self-directedness if facilitated when the learning program includes opportunities for direct instruction in . . . competencies . . . [and] when opportunities are provided for the learner to see the role of self-directed learner modeled." (pp. 58-59)

Underlying all these conceptualizations are the beliefs that the development of self-directedness in learners should generally be encouraged, and that a desire to be self-directed cannot be assumed for all adult learners. The means to actively facilitate self-directedness and the related attributes of autonomy and independence inform many conceptions of adult distance education.

Learner Autonomy and Independence

Keegan (1986) described distance education as:

> 1. The quasi-permanent separation of teacher and learner throughout the length of the learning process (this distinguishes it from conventional face-to-face education);
> 2. The influence of an educational organization both in the planning and preparation of learning materials and in the provision of student support services (this distinguishes it from private study and teach-yourself programs);
> 3. The use of technical media – print, audio, video or computer – to unite teacher and learner and carry the content of the course;

> 4. The provision of two-way communication so that the student may benefit from or even initiate dialogue (this distinguishes it from other uses of technology in education); and
> 5. The quasi-permanent absence of the learning group throughout the length of the learning process so that people are usually taught as individuals and not in groups with the possibility of occasional meetings for both didactic and socialization purposes. (p. 44)

Various distance education researchers have focused almost exclusively on the nature of the instructor-student relationship. Holmberg (1983) believed that establishing a personal relationship between instructor and student was necessary to motivate the student and promote learning. He suggested that "guided didactic conversation" – friendly, informal, two-way, non-contiguous communication, including learner interaction with written or recorded instructional material, written feedback from instructors, and telephone conversations between instructors and students – could be used to simulate conversations that occurred in the classroom between the instructor and learner. He suggested that this type of communication at both an intellectual and emotional level could strengthen instructor-student relationships, provide study pleasure, and motivate students to achieve learning goals. This in turn would produce better overall learning experiences at a distance (pp. 43, 92).

Amundsen (1993) concluded that Holmberg conceptualized learning as essentially an individual act of internalization. Thus instructional design that supported learner autonomy and independence was important for learners at a distance. Distance education institutions need to provide open access and unpaced courses to learners and not require group learning activities, for instance (pp. 64-65).

Other writers characterized effective distance education processes as "reintegrating" the teaching and learning acts – that is, replicating as many of the attributes of face-to-face communication as possible, yet maintaining learner autonomy. Keegan (1990) stated that interpersonal communication at a distance did not need to be limited to more direct forms of instructor-student interaction like telephone conversations or teleconferencing during the "provision" phase of instruction, but could also be re-created through appropriate design and use of printed instructional materials in the "preparation" phase. In this instance, reintegration occurred when printed learning materials were easily understood, anticipated potential learner problems, provided carefully constructed course objectives and content, attended to the design and appearance of the instructional material, and contained ample practice questions and related feedback. Reintegration also occurred when actual instruction commenced, through the use of written assignment feedback, teleconferences, video conferences, or various forms of computer-mediated communication (p. 112).

Like Holmberg (1983), Keegan did not view group learning as an essential feature of distance education. Rather, the absence of group interaction was one of the hallmarks of distance education, in his opinion. He stated,

> Together with the separation of the learner from the teacher, the separation of the learner from the learning group throughout the length of the learning process is a characteristic feature of this [distance] form of education which distinguishes it from conventional, oral, group-based education. (p. 42)

Keegan therefore considered the more important characteristics of adult distance education to be learner independence and personal responsibility for educational outcomes and processes. This view was similar to those of Knowles (1970, 1983) regarding the nature of adult education in general.

Moore (1983) also maintained that self-directedness and autonomy were desirable attributes for all mature learners, regardless of whether learning occurred in a classroom or at a distance. While autonomy might be temporarily surrendered by learners, they should still maintain overall responsibility for the direction of their learning experiences (pp. 62-64). To Moore, the degree of learner autonomy was directly related to the amount of "transactional distance" that existed between instructor and learner.

Transactional distance could exist in any mode of instruction, though it tended to be more prevalent in distance education because of the physical separation of learner and instructor. The term referred specifically to differences in perceptions and understandings between instructor and learner, only some of which occurred as a result of geographic separation. Although increased transactional distance created a greater potential for misunderstanding, he believed that it was generally advantageous because it encouraged the development of learner autonomy (p. 70).

Moore described the components of transactional distance as *dialogue* and *structure*. Dialogue meant the degree to which one-to-one interaction was present between learner and instructor in the instructional process. This was determined by variables such as subject-matter, personality and educational philosophy of the instructor, and environmental factors – chiefly the medium of communication. The mere provision of instructional material did not constitute dialogic activity in Moore's opinion. However, written assignment feedback constituted a limited form, while teleconferencing and one-to-one telephone tutor support represented enhanced forms of dialogue. Greater dialogue decreased the transactional distance, and hence decreased learner autonomy, in Moore's framework.

Moore described structure as the degree to which individual learning needs were met by an educational program. A program of learning which adapted objectives, processes and evaluation methods to a particular learner's needs resulted in less structure, in Moore's opinion. Specified start and end dates for courses and due dates for assignments, the use of mass-produced, non-customized instructional packages, restricted registration practices, and non-negotiable learning outcomes all increased the structure of the educational process. Increased structure decreased the transactional distance, and hence decreased learner autonomy (pp. 10-11).

Learner Interaction

However, not all writers agreed that learner autonomy and independence were the chief hallmarks of adult learning. Garrison (1988) argued that the emphasis on self-directedness in distance education research and practice needed to be constrained in some respects because it perpetuated the belief that "adults know what is best for them educationally and the teacher is only there to assist the learner in whatever she or he wants" (p.125). Rather, he expressed the need for a balanced approach between dependent (teacher-centred) relationships found in face-to-face and, to a lesser extent traditional distance education, and the tendency to stress independent (learner-centred) relationships in the emerging electronic learning environment. The ability of instructors and learners to communicate openly and collaboratively and determine the appropriate, delicate balance between the needs, values, and perspectives of both parties was a particularly strong and promising feature for adult distance education with the advent of interactive electronic communication technologies (pp. 125-126).

As a result, Garrison argued that learning was not primarily an individual, internal process, nor could the printed instructional material used in traditional distance education adequately reproduce the instructor-student interaction found in a traditional classroom. He considered that learning was essentially a collaborative process between instructor and learner and among learners, and that learning occurred in an atmosphere where perspectives could be challenged, meaning negotiated, and prior experiences used to inform current learning processes (pp. 12-15).

Garrison suggested that the primary purpose of distance education was to sustain personalized, two-way communication in the learning process. By so doing, it simulated the educational transaction that occurred in the classroom between instructor and student.

He saw mediated two-way communication as the "unique and defining characteristic of distance education" (p. 118), and added,

> While the packaging of information for learning is important in many methods of distance education, it does not adequately reflect the essential nature of the educational transaction nor is it characteristic of all forms of distance education. Communication is the interface between teaching and learning. Two-way communication between teacher and student represents the most basic element of the educational transaction. It is the means by which we negotiate meaning and validate knowledge. (p. 122)

In Garrison's view, dialogue and debate were essential for learning because these forms of two-way communication allowed learners to negotiate and structure personally-meaningful knowledge. Teaching transmitted societal knowledge, he argued, but also needed to foster critical analysis processes to bring personal perspective to bear and create new understanding for both the teacher and student (pp. 7, 19).

However, Garrison stated that instructional material was still relevant to the learning process at a distance. It was merely communicated through a different medium than dialogue. He suggested that Moore's concepts of dialogue and structure were operationalized in conventional classroom-based education through the same communication medium (for example, a lecture, followed by questions), though it occurred in the same place and through speaking and listening actions. In distance education, he noted, the means for sustaining dialogue between the instructor and student were different from the means by which course content was communicated. The latter (structure) was communicated through one-way communication – print, for instance. Interactive communication (dialogue) required a two-way communication medium between the instructor and student. This resulted in "communication loop" as follows:

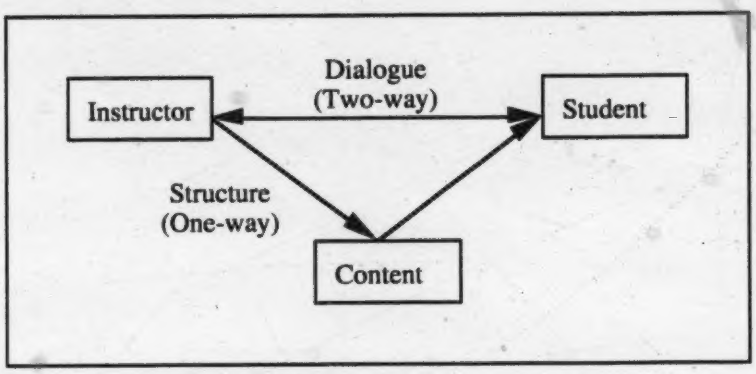

Figure 1. The communication loop in distance education
(Adapted from Garrison, 1989)

Anticipating this model, Garrison and Shale (1987) described three criteria which they felt distinguished the learning transaction at a distance. These criteria emphasized the use of two-way communication in distance learning processes, and proposed that

1. the majority of teacher-student and student-student communication was non-contiguous.
2. two way communication was necessary to invoke the educational process at a distance between teacher and student, and among students.
3. technology was used to mediate this two-way communication. (p. 6)

Garrison (1990) considered that the modern era of distance education had been ushered in with the emergence of new forms of two-way communication technology. In his opinion, improvements in communication had sufficiently changed the nature of distance education so that Keegan's fifth distinguishing characteristic of distance education – the quasi-permanent absence of the learning group throughout the length of the learning process – was no longer descriptive. The ability of this technology to support collaborative learning at a distance suggested that eventually the learning process might not vary significantly between distance education and traditional (i.e., classroom-based) education. The distinctions between distance and classroom-based education might gradually disappear as emerging distance education communication technologies more closely simulated the educational exchanges that took place between teacher and learner in a classroom. Shale (1990) stated further that two-way communication technology had produced such a radical shift in the underlying nature of distance education that it could now be considered part of the educational mainstream.

Holmberg (1990), though, took exception to these assertions. He argued that the vast majority of distance education continued to be based on a correspondence model, characterized by student independence, non-contiguous communication, and the use of printed material as the primary means of instruction. This model could be supported with various means of two-way communication depending in part on financial considerations, and instructor and student preferences. Mediated communication had always been a primary characteristic of distance education, he maintained, but this merely supplemented the traditional correspondence-based model of distance education. As a result, the nature of distance education may have evolved, but it had not been revolutionized with the introduction of new forms of two-way communication technologies. He stated:

> This leads me to the conclusion that today's distance education is either identical with or a direct descendant of traditional correspondence education and that the alleged breach of tradition is nothing but a myth. Some colleagues may – perfectly legitimately – find it desirable to bring about a "paradigm shift." So far none is in sight. (p. 55)

Garrison and Shale (1990) responded that Holmberg had overstated the centrality of "correspondence" features of distance education by observing predominant practice, not new trends. They reiterated Garrison's earlier view of distance education as a collaborative experience between instructor and student, and the primacy of ongoing instructor-student communication. They considered this to be a significant departure from what they saw as the prevailing view of distance education typified by Holmberg –

essentially print-based correspondence study, supplemented at times with mediated communication.

In their view, this conception of distance education was deficient because it relied on enabling technologies to define the phenomenon. Correspondence study, they argued, had arisen as a result of technological innovations – the mail and telephone systems. These systems were being replaced by newer, more effective mediated two-way electronic communication systems. A more integrative, technologically-independent view of distance education was needed which focused on the essential educational features of learning at a distance. Garrison and Shale defined this to be sustained, two-way communication between instructor and learner, as a student's internal interaction with learning materials prepared by an instructor could not be considered interactive communication between human beings. Without sustained dialogue between instructor and student and among students, Garrison and Shale noted,

> . . . there is no opportunity for perspectives to be challenged, meaning to be negotiated, integration of learning to previous experience – all of which provide a deep as opposed to surface understanding. (p. 45)

Their arguments disputed the idea proposed by Holmberg that guided didactic conversation and similar forms of essentially print-based instruction could be considered two-way communication.

This debate also affected the conception of the instructor role in distance education. Garrison and Shale argued that telephone tutors are often seen as ancillary resources by students, who use them only as required in correspondence-based distance education. However, the new form of educational transaction sustained by ongoing two-way communication requires an instructor who is not an optional learning resource, but is needed to "monitor and guide the cognitive aspects of the education experience" (p. 45).

The nature of this new form of educational transaction is considered next in the context of computer-mediated learning environments.

Characteristics of Computer-mediated Communication

Although Garrison (1989) generally considered the use of all two-way communication technology in education to be "revolutionary" because it replicates at a distance the interactive learning processes that occur in a classroom, other writers considered that the term more appropriately applied to asynchronous (time- and place-independent) forms of two-way communication like CMC. These latter forms, it was argued, provide significantly greater educational benefits than synchronous (time-dependent, place-independent) forms of communication like teleconferencing, video conferencing, and audiographic conferencing.

Positive Attributes of CMC

Compared to synchronous electronic communication mediums, Harasim (1996) suggested that CMC uses more facilitative learning models, improves students' writing and analytic skills and the learning process in general, and encourages more equal participation. She also argued that the ability of the medium to support collaborative learning at a distance creates a unique and successful distance learning model that is distinctly superior to face-to-face instruction and either correspondence-style or synchronous forms of distance education (p. 205).

Other writers also suggested that the textual nature of the CMC medium makes it distinctive. Kaye (1989) saw computer conferencing as a means to simulate both written and spoken communication at a distance. Its textual nature enables forethought and provides structure to the learning environment, somewhat like print-based materials. Further, the various forms of computer-mediated communications (e.g., e-mail, computer conference contributions) are relatively permanent and can be reviewed by participants. These features and the opportunity for dialogue allow computer conferencing to create textual "conversation" – the development of thoughts, expression of different understandings, and resolution of conflict – that are similar to spoken or face-to-face conversation. These combined features make it particularly suitable to the distance education environment (pp. 10-11).

Collins and Berge (1995) argued that computer-mediated communication stimulates greater thought and thus better learner contributions because participants are aware that their comments will be viewed by a wide audience. Harasim (1996) suggested that CMC enables instructors to assess learner progress more effectively, since the extent of an individual learner's participation is documented and readily available. Bates (1995) also noted that the assessment of individual contributions to group work can be facilitated by the written transcript. Further, computer conferencing is a useful means to reinforce development of students' analytic and writing skills because it requires them to construct and defend arguments, and critique other scholars' works in a textual medium (pp. 208-209). Gunawardena (1992) described her personal experiences with CMC as a supplemental instructional medium in two courses offered at the University of New Mexico – one audiographics/CMC-based, and the other classroom-based. She proposed that CMC allows students to think more deeply or consult outside sources before responding, and so improves their contributions.

The benefits of group and collaborative learning facilitated by CMC were also cited. Kaye (1989) noted that CMC enables time- and place-independent collaborative learning to occur not only between the teacher and the learner, but also among learners. Harasim (1989) found that computer conferences allow knowledge and understanding to be shared among students at a distance by providing a common point of reference like specified conference topics and transcripts of prior conference messages. These focus group discussions and encourage reflective interaction (p. 52).

Harasim (1990) suggested that CMC allows learners to create new knowledge through the process of peer collaboration. Peer collaboration also invokes deeper thought processes in learners by facilitating idea generation and linking, and bringing multiple perspectives to bear on issues. This process helps students structure knowledge internally and is one of the most significant benefits to learners at a distance. Consequently, computer conferencing was the first communication medium to support the educational aims of cognitive theory among learners distant from each other in time and space, in her opinion.

Seaton (1993) summarized the outcomes of three CMC research projects at Thomas Edison State College, the New Jersey Institute of Technology, and Boise State University. He noted that CMC enables instructional practice to evolve from information dissemination to encouragement of critical enquiry, and from instructor-dominated to collaborative learning practices (p. 52). Similarly, Harasim (1996) suggested that CMC changes the role of the learner from information absorber to information provider. Consequently, the authority of instructors and their function as knowledge providers decreases. Instructors become facilitators, provide educational structure, guide learners to information, and assist them in organizing this information into knowledge. This promotes learner-centred learning (pp. 210-212).

In the view of Jonassen, Davidson, Collins, Campbell, and Banaan-Haag (1995), the CMC medium not only permitted collaborative learning, but also supported the social construction of knowledge. This occurred if CMC learning environments are "[based on] authentic tasks, engage learners in meaningful, problem-based thinking, and require negotiation of meaning and reflection on what has been learned" (p. 21).

CMC was also described as a force for egalitarianism and inclusiveness. Harasim, Hiltz, Teles, and Turoff (1995) proposed that the asynchronous, many-to-many model of computer-mediated communication encourages learner participation and is therefore democratizing. Harasim (1996) explained that on-line education encourages inclusiveness because it expands access to educational opportunities for those who are physically limited or remotely located, or who have significant family, work, or social responsibilities. It also increases the quality and quantity of learner participation because it allows all "voices" to be heard, and disguises or eliminates socially-differentiating factors like physical appearances, handicaps, and gender. She also suggested that students have more access to alternate sources of information, more anonymity, and more control over the nature of their interactions. As a result, students are more likely to challenge their instructors.

Collins and Berge (1995) noted that CMC equalizes status among students because social cues regarding roles, rank and status are reduced. Further, CMC promotes multicultural awareness because a particular learning experience is accessible to a wide variety of individuals regardless of geographic region.

Davie and Wells (1991) proposed that instructors become more facilitative and participative in the CMC environment. Because student comments are reproduced with their names, instructors are also better able to form and maintain memories of particular students, which in turn increases interaction and allows more personalized relationships to form between students and teachers. As a result, they suggested that on-line instructors are more likely to perceive learners as autonomous and to empower them compared to either a traditional distance education or a classroom-based learning environment (pp. 16-17).

Some writers noted that CMC also allows individual learning needs to be addressed. Snell (1996) stated that learning strategies can be more easily customized for individual learners in a CMC environment. CMC also improves learning conditions for slower learners because they have more control over the pace of their work. Bates (1986), in a study comparing the educational philosophies underlying computer assisted learning and computer-mediated communication, found that CMC instructors were better able to tailor their instruction to the needs and desires of their students than classroom-based instructors (p. 54).

The social benefits for learners at a distance were also cited. Kaye (1989) noted that computer conferencing facilitates "serendipitous" interactions, whereby students can engage in social exchanges which are not directly related to specific learning objectives, but which are nevertheless personally valuable (p. 12). Bates (1995) contended that because controlled hierarchical approaches to learning tend to be reduced in computer conferences, students are able to use the computer conferences to meet some of their social needs (p. 209). Mason (1992) suggested that computer conferences, though not a substitute for informal social networks formed at campus-based universities, do provide varying degrees of support for socially-isolated learners. Harasim (1996) argued that the ability of CMC to build communities of learners at a distance has a positive social-emotional aspect (p. 209).

In the opinion of some writers, the various attributes of CMC described above have the potential to transform the distance learning experience. Its ability to facilitate knowledge construction, to support various forms of collaborative learning, to improve cognition, to encourage more equal participation, and to provide social contact for relatively isolated learners are particularly promising. However, various writers also identified disadvantages of the medium.

Negative Attributes of CMC

Negative aspects of the CMC medium suggested in the literature often relate to practical problems associated with the use of computer hardware and software. Mason and Kaye (1990) noted that the necessity to read large amounts of computer conference postings can be just as constraining on students as regular classroom attendance (p. 27). Bates (1995) found that existing CMC software often neither allowed important messages to be flagged nor permitted appropriate emphasis be attached to text-based interchanges. He also reported that students experienced problems with information overload in a large on-line course at the British Open University, because technical problems resulted in a flood of messages (p. 211).

Gunawardena (1991), in her study of learners at several U.S. universities, found that computer conference participants had difficulty maintaining a clear picture of the various computer conference discussion threads over a lengthy period of time. However, limiting conference discussion time to avoid this problem reduced the ability of participants to think and do off-line research before participating (p. 18).

Eastmond (1995) noted that computer conference participants sometimes grew frustrated with delays in responses to posted messages, and had difficulty following simultaneous discussions on multiple topics because of poor referencing or lack of graphical representation of the conference structures. Equipment and software also malfunctioned, computer screen sizes were sometimes too small, and some students were simply not familiar with the use of computers. Bates (1995) observed that most CMC software still did not readily incorporate multi-media, nor have intuitive user interfaces (p. 212).

Some types of student behaviour in CMC environments were also cited as problematic. Bates (1995) observed that students who have inadequate computer and keyboarding skills or who are unable to make clear, unambiguous written statements appear to be at a disadvantage in the computer conferencing environment (p. 212). Collins and Berge (1995) suggested that the lack of social cues coupled with the relative anonymity of CMC could encourage objectionable behaviour among a small number of participants, or unsettle participants who prefer the more familiar social aspects of face-to-face communication (pp. 3-6). Eastmond (1995) agreed, noting that participants could feel socially awkward because of the absence of subtle socio-emotional cues in the electronic environment. He also considered "lurkers" to be a problem (students who read computer conference discussions, but do not participate).

Gunawardena (1991) stated that the text-based, relatively anonymous nature of computer conferencing initially appears to equalize participation, unlike classroom settings where more-vocal students tend to dominate. However, the lack of equal access to necessary computer hardware and software, fear of the technology, or the particulars of group dynamics in computer conferences can result in unequal participation, and thus less-effective group communication.

Gunawardena also challenged the notion that computer conferences tend to be democratizing. She found that though the text-based nature of computer conferencing reduces bias based on characteristics like gender, race, or other distinctive physical features or bias based on socioeconomic status, other discriminatory practices seem to occur as conferences progress. These affect participation but are subtly conveyed to students. For instance, she noted that opposing points of view or the contributions of certain students can be more easily ignored than in a classroom. Some students are also uncomfortable about joining the discussions because they do not perceive themselves as part of the dominant "intellectual" group (pp. 18-20).

Some problems with peer learning were also noted. Kaye (1989) proposed that although computer conferencing increases the opportunity for peer learning, errors in understanding are more easily propagated among students than in the classroom environment.

Finally, Bates (1995) suggested that students can get too emotionally involved with others in the computer conferences, and that the medium could be addictive. However, he noted that ". . . emotional absorption needs to be seen as an excess of a good thing, rather than a bad thing in itself" (p. 212).

The literature raises several concerns about the CMC medium, in particular problems with information overload and structure, covert restrictive practices which can affect participation, and other undesirable effects on individual and group learning patterns. Because of the unique two-way learning environment created by electronic interaction and its attendant technical and learning challenges, instructors play an important part in the CMC learning experience. Many researchers have discussed the nature of on-line instructor-student interaction and its effects on instructional practice.

Instructors in the CMC Environment

Some writers suggested that it is important for instructors to redesign their course structure to improve the effectiveness of the on-line learning experience. Seaton (1993) found that CMC can create an effective community of self-directed learners. However, it is not the CMC medium *per se* which causes this change, in his opinion, but rather the redesign of course structure and content which is prompted by asynchronous electronic instruction. In this study, instructors significantly determined the type of learning that took place, through course design and evaluation decisions, and computer conference practices (pp. 50-51). Similarly, Davie and Inskip (1992), reporting on the results of their CMC-based graduate education classes at the Ontario Institute for Studies in Education, stated that favourable outcomes for CMC-based learning depend more on creative design decisions on the part of instructors that encourage participation and active learning by students, and less on the technology employed (p. 31). Miller (1989) also argued that two-way mediated communication forms like CMC were not transforming forces in themselves. Rather, curricular and learning process changes prompted by the introduction of the medium had more significant effects on the learning experience.

Boston (1992) reported on the results of offering six CMC-based undergraduate courses at Houston Community College. He found these courses encouraged instructors to write more concise instructional material for distance-based students, which also aided in-class presentations. He also noted that a combination of classroom- and distance-based instruction allows instructors to develop and use more active learning exercises (p. 55). In the view of Berge (1995), and based on his experience as a moderator of several large computer conferences, successful on-line instructional practices are predicated on well-developed learning objectives. He argued that instructors need to combine computer conferencing activity with other forms of electronic media to produce an effective instructional system (p. 22).

Harasim (1987a), reporting on a study of two on-line graduate-level courses conducted at the Ontario Institute for Studies in Education during 1986 and 1987, suggested that the best pedagogical fit between CMC instructional methods and content occurs in upper-level baccalaureate and graduate programs because of the generally smaller class sizes, the expectations that students will contribute to the discussions, and the closer relationships that form between instructors and students. She suggested that the CMC environment can be used as a more effective means of learning if instructors concentrated on developing new educational approaches to the medium, rather than trying to recreate electronic versions of traditional classroom-based courses. Courses which feature more learner-centred and group-based collaborative activity are possible and should be encouraged (pp. 118-19, 133).

Other writers noted that CMC instructors needed adequate technical training. Bissell and Coombs (1987) used CMC to improve student-teacher interaction in classroom-based modern American history and introductory microcomputer courses at the Rochester Institute of Technology. They found that faculty training is crucial to the successful incorporation of CMC because users often experience technical difficulties (pp. 7-9). Hiltz (1986) reported the results of a study of three undergraduate CMC-based courses at the New Jersey Institute of Technology. Using a combination of qualitative and quantitative techniques, she found that teaching effectiveness is directly correlated with the amount of technical training and support that is provided for the participants and the amount of student interaction that is encouraged in the conferences. Seaton (1993) also noted that greater instructor familiarity with the technical aspects of the medium result in better learning outcomes for students. Gunawardena (1992) described learning to effectively use audiographics/CMC technology as one of the most important skills that she needed to develop as an instructor in the electronic medium.

In common with some other writers, Gunawardena (1992) also reported that she needed to improve her on-line communication skills, and that her teaching style changed as a result of her CMC experiences. Eventually, she dispensed with plans to lecture students, focused on learner-initiated discussion and enquiry, and used group-based, collaborative learning activities in some cases. As a result, she found that her role changed from knowledge expert and classroom authority to a guide and supporter of learners. She also observed that her instructional role became more difficult. She had to work as part of a course team and her role as an instructor expanded to include more technical areas. Because the time needed to effectively plan, implement, and facilitate these types of courses was significantly under-rewarded, she felt that the innovation process at her educational institution was inhibited (p. 59).

Rice-Lively (1994) conducted an ethnographic study of a state-wide graduate education seminar offered on-line by the University of Texas in order to better understand the nature of an Internet-based learning community. In common with many social groups, she found that computer conference participants take on different roles which are either designated as such by the instructor or assumed by the participants themselves. Like Gunawardena (1992), she also noted that she took on a more consultative role as a CMC instructor, acting as an educational resource and facilitator. This encouraged more student-based discovery learning. The leadership role in the conferences also alternated between the instructor and students, with students generally taking more responsibility for their learning. Rules of conduct appeared to be implicitly developed and followed by the group, not explicitly described and enforced by the instructor.

Florini (1989) concluded that the asynchronous nature of CMC necessarily favours increased student participation, and that the instructor becomes more group-oriented and less authoritarian as a result. However, instructors often need to moderate the tone of their conversation in the CMC environment to convey warmth and acceptance, and hence increase student participation levels. She also suggested that switching from a role of relative authority figure in the classroom to one which is more inclusive and collaborative in the asynchronous electronic environment is difficult for many instructors (p. 49).

Davie (1989) described his experiences with two distance-based graduate courses offered at the Ontario Institute for Studies in Education. The courses experimented with the use of two facilitation techniques – joint assignments to foster student collaboration, and student editing of computer conferences to teach synthesizing skills to students. He noted that the more successful instructors appeared to change their instructional styles as their courses progressed and encouraged students to advance from making individualized comments to undertaking more difficult tasks, such as participation in small-group projects and conference moderating.

Based on his experiences as a humanities instructor who had delivered several CMC-based courses, Feenberg (1987) concluded that the medium gives rise to "communication anxiety" because of the lack of visual and complex, verbal forms of politeness found in most face-to-face conversations. Senders of computer conference messages, for instance, know that a message has been received, but not how it has been received. Like Florini (1989), he found that the role of the on-line teacher changes from that of providing authoritative opinion to one of encouraging personal viewpoints and diversity of opinion. As a result, he felt that successful conferences require moderators (generally the instructors) to take on new roles and supply context, social ambiance and leadership in general to the on-line discussions, to somewhat make up for the loss of these "tacit" cues found in face-to-face conversation. He noted, "More often than not, when conferences fail it is because the person in charge is unable to overcome the initial difficulty of transposing leadership skills acquired in face-to-face settings to the on-line setting" (p. 177).

Feenberg stated that instructors need to share personal experiences and otherwise develop a sense of inclusiveness. He considered weaving – the identification and linking of somewhat disparate ideas in the computer conferences – to be a particularly valuable instructional practice because this activity supplies a unifying discourse to the on-line conversation, and gives the group a sense of accomplishment and direction.

Other writers formed conclusions about appropriate instructor functions in computer-mediated learning environments from studies involving student moderators. Murphy, Cifuentes, Yakimovicz, Segur, Mahoney, and Kodali (1996), in a case study of

89 graduate education students, two graduate assistants, and two faculty members in computer conference courses at Texas A&M University, noted that faculty in these conferences played a background, facilitative role by design. Student moderators were used to lead conference discussions. Using naturalistic enquiry, the researchers found that the student moderators were influenced by three moderating techniques they had learned in their graduate class – developing conference structure, maintaining conversational flow, and weaving– and also by their own personal communication styles. These styles were found to be influenced by individual prior experiences, philosophical orientations, and pedagogical styles. Overall, student moderators tended toward informality, which in turn reduced perceptions of hierarchy between them and their fellow students. However, Tagg (1994), in a study of student-moderated computer conferences at the University of London, found that students overwhelmingly preferred instructor (faculty member) feedback in the conferences because of their subject-matter competency.

Some researchers suggested that instructional style could be somewhat more flexible in the CMC environment and variable within a particular course or over time. Eastmond (1995), in his qualitative study of nine students, one instructor, and one technical support person involved in an undergraduate CMC-based course at a U.S. college, suggested that effective learning could occur in a competitive CMC environment, as well as a collaborative one. Instructors need to determine the appropriate teaching style necessary for the applicable course, and alter their approach accordingly (p. 200). He also noted that his students found instructional style to vary along a collaborative/competitive continuum in terms of style, frequency of interaction, involvement in on-line discussions, and amount of prompting and other strategies used to evoke responses. In the final analysis, Eastmond stated, a wide range of instructor attributes appear acceptable to students, providing that instructors exhibit enthusiasm in, and attention to, the interactions of their on-line courses. Florini (1989) also suggested that recognizing individual teaching styles, institutional contexts, and the various characteristics of the applicable electronic medium allow for more personalized, flexible, and effective approaches to CMC instruction.

Various writers classified the role of the CMC instructor into different functions. Based on his experiences moderating several on-line discussions, Berge (1996) suggested four types of practices necessary for successful facilitation of on-line discussions – *pedagogical*, for example, setting clear group objectives, and questioning and probing for student responses in order to focus on critical components of the discussion; *social*, or creating a warm and friendly atmosphere to promote relationships and group cohesiveness; *managerial*, like setting agendas for various conferences, establishing procedural rules and group norms of behaviour, and generally providing strong leadership and direction on procedural issues; and finally, *technical* – helping participants to become comfortable with hardware and conferencing software, and making the technology as transparent as possible.

Carrier and Schofield (1991) and Feenberg (1989) also viewed instructors as performing essentially four types of functions. Instructors perform *methodological* functions, which help learners acquire knowledge. Instructors act as chairpersons, prepare agendas, summarize and clarify comments, work the group toward consensus or at least mutual understanding of issues, and bring closure. They also act as translators who link, interpret, introduce information and alternate points of view, generalize, and establish an underlying coherence to the discussions.

Instructors also perform *metacognitive* functions, assisting the learners' understandings and conscious control of their learning processes. For example, instructors weave, identify, and summarize salient features of the on-line discussions to create unified threads through the participants' comments. This in turn stimulates cognitive development of the group members and encourages them to pursue their ideas further.

Instructors provide *emotional support and motivation* for students. They act as social hosts, make participants comfortable, and encourage participation. They also act as *contextualizers*, by reminding participants of the general parameters and norms of behaviour for discussions that have been established for or by the group, and monitoring general acceptance of these. They perform *metacommenting* functions, drawing attention to the underlying processes used to establish these norms, for instance, and also addressing issues like information overload. Lastly, instructors perform *administrative* functions. They assist or guide learners through various institutional procedures and requirements.

Other writers have suggested the use of specific instructional practices. From a review of various CMC studies, Davie and Wells (1991) noted several characteristics of successful CMC instructors. These instructors pose questions more often than their classroom counterparts, rather than merely supply answers, tend to redirect applicable student enquiries to the computer conference group, learn the value of silence so that students can contribute, and encourage students to participate directly through their on-line comments or indirectly by designing assignments that encourage participation (p. 16).

Kerr (1986), based on her experiences over several years with the Electronic Information Exchange System at the New Jersey Institute of Technology, studied effective computer conference structures, processes, tasks, and roles. She suggested that egalitarian leadership produces the best rates of participation, and that in general, techniques for moderating on-line discussions differ significantly from those used in face-to-face instruction. However, she also stated that instructors need to be familiar with the technical aspects of the conferencing software, to establish agendas for each group, and to keep participants working toward a common goal in order to make computer conferences productive. Instructors also should clarify the conference group structure, particularly the differences between private and group messages. Certain structural tasks also need to be undertaken by instructors, such as establishing student sign-on expectations, setting up new sub-conferences, spelling out tasks within the group, and establishing deadlines. She reported that initial face-to-face sessions with instructors and students are advisable, and that good leadership skills (for example, focusing the group on goals) are necessary to successfully moderate computer conferences. In addition, instructors need to know their students well, in part by spending at least 30 minutes each day on-line.

Tagg and Dickinson (1995) reported on their work using computer conferencing in a graduate-level distance learning program at the University of London. They stated that instructors should primarily support discussions within computer conferences (p. 34). However, an analysis of instructor responses in their study found that neither quantity of responses, promptness, nor limited encouragement alone necessarily resulted in active student participation. Rather, they concluded that ". . . a pattern of frequent, prompt [instructor] responses that address individuals and offer guidance in a succinct and predictable manner seems to be most effective in encouraging student activity" (p. 52). They added, though, that student activity levels in their study were difficult to interpret because of the presence of many influences outside the group itself, such as course scheduling and differing levels of familiarity with the relevant technology.

Rojo (1991) conducted semi-structured interviews with nine participants in various graduate-level computer conferences at the Ontario Institute for Studies in Education. She explored patterns of usage and attempted to systematically describe participation characteristics. Students, she found, primarily use CMC as a messaging device – to exchange information not directly related to the course content, and to arrange meetings, for instance – and as a contact device to fulfill certain social needs. She also noted that participants often express frustration over the lack of substance in on-line discussions. She concluded that instructors need to provide context for on-line interactions, monitor participants, provide reassurance that their comments are worthwhile, and weave various conference discussion topics into a coherent whole to provide successful CMC learning experiences (p. 116).

Ahern, Peck, and Laycock (1992) studied the effects of three types of instructor discourse patterns in computer-mediated conferences on eighty students enrolled in an undergraduate introductory educational theory and policy course at a large U.S. public university. They found that "conversational" types of instructor interactions rather than more formal questions or statements produce higher levels of student participation, trigger more creative, spontaneous discourse among students, and aid cognition.

Yeoman (1995) presented a case study of "Sam's Cafe," a computer conference which used the medium as a dialogic form of journal writing. Though she noted that students participated in the conference because it was relevant and interesting to them, the instructor also played a key role in facilitating communication and understanding in the discussions by periodically interjecting, encouraging and modeling the use of humour and role-playing, and making provocative comments (p. 217).

Mason (1991) used a case study of an on-line conference presented by The Western Behavioral Sciences Institute to illustrate what she considered to be exemplary organizational, social, and intellectual attributes of a particular conference moderator. The moderator provided context for students, including personal opinion and "hooks" to stimulate participants' responses, exhibited enthusiasm and commitment to the conference, used student comments to develop further themes, and importantly, modeled concepts under discussion by tying these into personal experiences. From this study and a related review of literature on CMC instructors, Mason suggested that on-line instructors could be more successful when they establish the conference agenda, including objectives and a timetable for discussions, and introduce "meta-comments" that change the context, norms, or direction of the conference. They also need to create a friendly, social environment by sending welcoming messages to participants, for instance, but also by building on these opening comments to focus on the objectives of the conference. Most importantly, successful instructors link together what initially appear to be unrelated comments and ask questions and probe responses at crucial junctures to encourage students to develop their thought processes more fully.

Davie (1989) also found that instructors play an important role in the learning process by modeling appropriate on-line behaviour – encouraging participation, demonstrating appropriate responses, summarizing discussions, and re-focusing the group on the conference topics as needed. When these techniques were used, instructors in his study concluded that student performance was generally better than in face-to-face courses, though the results were drawn from a small group of participants.

Eastmond (1992) noted that computer conferencing uniquely supports adult learning styles suggested by Knowles (1983) and others. Instructors could and should encourage on-line discussions, allow learners to reflect on and synthesize group-based information, draw out their students' prior experiences, encourage sufficient learner reflection before responding, and support voluntary involvement (p. 25). Beckwith (1987) also suggested that instructors need to engage in group-problem solving activities to exploit the potential of computer conferencing.

In a qualitative study of two instructors and 21 students in two M.Ed. courses using CMC, Burge (1994) found two key instructor behaviours: first, *discussion management* – providing structure, pace and focus to the on-line discussions, and reducing negative student behaviour like flaming; second, *contribution* – providing quick and relevant technical and content-related help, responding quickly to individual student messages, giving group feedback like summaries of the discussions and directions to additional resources, and providing affective support like empathy and warmth (pp. 30-31). Burge found that instructors control the amount of discussion by reducing private e-mail among students to a minimum, logging on regularly, using various strategies to encourage student facilitation of the computer conferences, and regularly summarizing student contributions (pp. 28-29). As a result of her analysis of student and instructor experiences, she suggested that instructors need to establish specific sub-topics in conferences (and help students focus their contributions accordingly); require students to log on often; discourage lurking; transfer summarizing and weaving roles from instructors to students in early stages of the course; communicate ahead of time how often they would read and respond to conference discussions and private e-mail; and establish norms for small group behaviour, including acceptable limits on response time by students.

Riel and Levin (1990) explored the nature of electronic communication systems in various international learning networks and in the AT&T Learning Network, an electronic forum for teacher development at the University of Chicago. They found that more successful on-line communications depend on a pre-specified group and task structure, and the opportunity and requirement for contributions by all participants. They concluded that shared goals and clearly-specified outcomes, reasonable expectations for participants to read and respond to messages regularly, and strong leadership by the instructor are crucial to the success of on-line learning.

Harasim and Johnson (1986), in a study of electronic learning networks used by Ontario educators, also contended that instructors need to take active, leading roles in computer conferences. They cannot play secondary roles because the length of time that elapses in computer conference interchanges require them to consistently provide new and valuable information to learners, and carefully organize the on-line discussions.

Instructors need to determine if discussions have diverged sufficiently from the original theme to warrant a new subconference, for instance. Instructors also need to structure computer conferences so that learner responses are required, in order to encourage full participation (pp. 40-41).

Some writers concluded that instructors need to relinquish many forms of control to the other computer conference participants. Yeoman (1995) found that shared goals are important, but that specification and accomplishment of predetermined outcomes are not necessary in all cases. She noted that "while coherence and some shared goals or values are obviously essential to dialogue, an end product may not be" (p. 219). Nipper (1989) argued that the locus of control needs to be shifted away from the instructor to provide continuity and unity to the group communication process. As a result, the instructor becomes more of a co-participant, and the authoritative instructor-student relationship in traditional distance and classroom-based education is replaced with a more democratic, adult one (p. 73).

McConnell (1992) agreed with Nipper. Based on his experiences with CMC in a graduate-level management education program at Lancaster University, he disputed suggestions that instructors need to provide strong leadership for groups to be successful. He found that instructors did not need to make unilateral decisions about what types of comments are relevant, and that instructors do not need to enforce group participation by coercive means (for example, by basing part of the overall course grade on quality or quantity of conference contributions). He suggested that the traditional concept of the instructor as educational leader is unhelpful, even antithetical to adult education, including computer conferencing. Agendas, goals and activities that are democratically determined and methods of evaluation that were negotiated contributed to successful computer conferences. Processes which at the outset consciously diffuse issues of power and control inherent in the instructor-learner relationship and stress collective ownership and a joint sense of purpose seem to be the most productive, he argued.

Despite these attempts at egalitarianism, McConnell noted that normal instructor participation in ongoing discussions is construed differently by some learners than intended at times, in part because they perceive that instructors are not equals. Eventually, the assessment process reasserts that an unequal balance of power still exists between instructor and learner, similar to the power relationships found in more traditional (print-based, correspondence) distance education, and in the classroom (pp. 64-66).

The literature dealing with instruction in the CMC environment described a broad range of practice. There appear to be some differences of opinion regarding the most appropriate instructional functions, primarily with respect to the appropriate leadership role of the instructor. Related to this, there are conflicting accounts or opinions about the appropriate amount and nature of instructor interaction, the degree of direction that the instructor should supply to conference participants, and the extent of structure that should be built into computer conferences, for instance. Some writers argued that issues of power remain problematic, even though the CMC environment may initially appear to be more egalitarian.

Summary

This chapter has traced the evolution of distance education from its inception as study by mail through to one present-day form of asynchronous, electronic learning – computer-mediated communication. Conceptions of the distance education process appear to have changed as the technology has evolved. Some writers suggested that the ability of new telecommunication technologies to facilitate interaction among students and between students and instructors revolutionizes the nature of the educational transaction at a distance. Students are able to exercise more control over their learning experiences and construct shared meaning and group-based knowledge through the ensuing dialogue. This assertion was questioned by other writers, who suggested that the educational transaction at a distance has evolved with the introduction of interactive telecommunications, but has not been revolutionized. To them, CMC does not change the fundamental nature of distance education, which is still characterized by learner autonomy and independence, and not group learning and collaboration.

Other literature discussed more pragmatic features of the CMC environment. To some writers, the main advantages of CMC are its textual nature, the anonymity it affords, its potential to provide collaborative learning experiences while still enabling some types of learner independence, and the improvements it brings to the socio-emotional aspects of learning at a distance.

However, various writers also noted that CMC does have drawbacks. They found that the absence of familiar social cues, the asynchronous nature of the medium, and limitations of text-based input are some factors that could negatively affect the quality of student learning experiences. Technical difficulties also cause frustrations and inhibit communication among participants in some instances. Finally, despite claims for the egalitarian nature of the medium, some writers observed that discriminatory practices still occur among computer conference participants.

The literature also proposed that CMC instructors perform various functions, such as helping students to acquire (or construct) knowledge, assisting learners in understanding and taking greater control of their learning processes, providing emotional support and motivation, and performing a variety of administrative and organizational functions. Some writers suggested that certain types of instructor skills become relatively more important in the computer conference environment (for instance, meta-commenting, weaving, and socializing), that the role of the instructor as subject-matter expert diminishes, and that the medium is inherently democratizing. This in turn, it was argued, changes the nature of the instructor-student relationship from an authoritative to a more egalitarian one.

Other writers suggested that the most important and definitive characteristic of the instructor – that of authority figure – remains unchanged in the CMC environment. This view cannot be dispelled because CMC instructors generally continue to exert varying degrees and manifestations of influence over students in order to discharge their perceived duties as teachers.

Several observations arise from this literature review. Various writers seemed to express differing perspectives about the relevant learning processes that occur in the CMC environment. Some tended to characterize CMC as a means to develop specific competencies or higher-order cognitive skills. Others considered it a means to facilitate group interaction or to meet the social needs of otherwise-isolated students. On a more practical level, there appear to be some discrepancies regarding appropriate instructional practices.

As Kaye (1989) noted, perhaps the perceived usefulness of and experiences with CMC depend not only on instructional content and learner characteristics, but also on the particular writer's perspective (p. 11). Some excellent descriptive work of the CMC experience has been done, but primarily from the point of view of individual students (Burge, 1993; Rice-Lively, 1994; Eastmond, 1995). There appear to be few descriptive studies which primarily focus on the comparative CMC experiences of instructors.

This study illuminates some of these perspectives, by describing the experiences and thoughts of several CMC instructors about what they do and why they do it, and by reflecting on their accounts. First, though, the research method used in the study is described in more detail.

Chapter 3

METHODOLOGY

The second domain of learning proposed by Habermas (1971) – the practical – emphasizes the construction of knowledge through relationships. Knowledge construction is a process that gives meaning to our personal worlds through dialogue with others, and is associated with the constructivist (or interpretivist) paradigm. This paradigm forms the underlying orientation for naturalistic enquiry, the research method used in this study.

The Constructivist Paradigm

A paradigm, as Erlandson, Harris, Skipper, and Allen (1993) noted, "provides a way of looking at the world. It exerts influence on a field of study by providing the assumptions, the rules, the direction, and the criteria by which 'normal science' is carried out" (p. 7). The constructivist paradigm is informed by a set of beliefs that differ significantly from what is termed the objectivist-rational paradigm. The influence of these underlying beliefs have implications for how research is conducted in each paradigm.

Fundamentally, the constructivist paradigm assumes that the mind does not merely understand and remember external, objective knowledge from the sensory data which it receives from an outside world, but also significantly interprets these events. Past experiences, values, and individual personality attributes influence what individuals understand, and individuals construct personal worlds based on these interpretations. As a result, constructivism suggests that each person conceives of external reality somewhat differently.

Constructivism further assumes that individuals fashion meaning and personal truth out of these experiences as "social actors" – that is, through sustained interaction with other individuals. This process of interaction, combined with the unique personal history and actions of the participants and the individually-meaningful language they use to describe their experiences, results in realities that are socially-constructed, subjective, and time- and place-dependent.

Bruffee (1986) suggested that the constructivist paradigm "assumes that entities we normally call reality, knowledge, thought, facts, texts, selves, and so on are constructs generated by communities of like-minded peers" (p 774). As Lincoln and Guba (1985) noted, these constructions are often multiple, conflicting, and all (at least potentially) meaningful. Their relative explanatory value depends on which is the best-informed, sophisticated, and generally-accepted at a given point in time. The constructivist paradigm suggests that because we are influenced by our own culture and experience, it is not possible to objectively describe external reality. Hence, any method of enquiry is not value-neutral.

In contrast, Erlandson et al. (1993) noted that the prevailing objectivist-rational paradigm, ". . . assumes that there is a single objective reality that is ascertainable through the five senses, subject to the universal laws of science, and manipulable through the logical processes of the mind" (p. 14). Willis (1995) contrasted the constructivist paradigm to this, and suggested that the two paradigms proposed radically different answers to two important questions – the role of language and the nature of truth – and that these affected the nature and method of research conducted within each paradigm.

The objectivist-rational approach views language as theory-neutral, Willis stated, and capable of communicating meaning about an external world without changing this meaning. As he noted, "For objectivists, . . . the crucial aspect of language is its relation to an external reality" (p. 6). On the other hand, he stated that constructivists believe that language may not determine reality, but at least influences how reality is defined.[2] Consequently, it is not possible to be purely objective and rational, and many of the foundational, generally unstated "separation assumptions" inherent in objectivist-rational research are called into question – the separation of the knower from what is desired to be known, the separation of fact and value, the separation of data into that which is subjective and objective, and the separation of what reality is desired to be from what the data indicate it to be (p. 6).

Regarding the latter assertion, Willis suggested that objectivist-rational research methods assume that phenomena in the real world can be studied by suitable means, and that what really is true can be compared and contrasted to what we believe to be true. In this paradigm, sense data and logic are the primary means of coming to understand this reality. He stated,

> asserting that there is a real world out there is not the major point of disagreement [between the two paradigms. Objectivist-rational] approaches incorporate a rational tenet which proposes that through the thoughtful use of proper methods – such as scientific research – humans can come to know what that external reality is. (p. 8)

Alternately, the constructivist paradigm regards research in pursuit of objective knowledge of an external reality as unattainable because individuals are influenced by their own cultures and experiences. They agree about what reality is through group consensus and meaning-making, not by reference to externally-determined and verifiable data.

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[2] Though as Molenda (1991) noted, constructivism appears in different "strengths." At one end of the spectrum, external reality is acknowledged as subjectively perceived but socially-negotiated. At the other end, objective, external reality is denied. Knowledge is viewed as constructed entirely by the individual (p. 46).

The study of meaning-making that individuals engage in as they encounter the world is a main aim of constructivist research. Meaning-making is an iterative, internal, social negotiation process, where individuals debate and ponder within themselves what is "correct," and then negotiate with the larger community about the underlying purposes and meanings that they attach to events or ideas.

As Bruffee (1986) stated, constructivism as a field of research is principally concerned with matters of knowing and being, rather than explication of method (p. 119). Schwandt (1994) pointed out that the research process within this paradigm suggests directions of enquiry, but does not rigidly prescribe technique, and that the enquirer offers "constructions of the constructions of the actors one studies" which are necessarily subjective. Both research strategy and tentative conclusions are revised as new phenomena are observed, and more is learned about a particular situation (p. 118).

Naturalistic Enquiry

Naturalistic enquiry is a principal method of research in the constructivist paradigm. There are several major assumptions that flow from the constructivist paradigm which inform naturalistic enquiry in general, and which therefore apply to this study.

1. Assumptions about reality and truth. This study assumes that there are multiple understandings of the CMC experience among the interviewed instructors. Their experiences are therefore unique and individual.

2. Assumptions about common understandings. While experiences of the instructors are unique and personal, it is assumed that intersubjective understandings of others' realities are possible through acts of communication.

This communication provides a sense of common understanding among the instructors – a culture associated with a particular program, or collective impressions about the asynchronous electronic communication medium, for instance. As a result, it is assumed that broad themes and patterns about the instructional experience can emerge from the individual discussions with the instructors.

3. Assumptions about values. Chosen values influence what is important to me as the enquirer and therefore worthy of study. Values also influenced the nature and direction of my interactions with the participants. As the interviewer, I was the primary research instrument and determined the important and significant issues for study, within certain parameters. I also influenced the instructor's responses through the nature of my questions, my responses to their comments, body language, and the tone and inflection of my voice. I was in turn influenced by similar actions of the instructors.

4. Assumptions about the generalizability of the findings. Since human choice informs action, freedom to exercise choice makes it difficult to establish cause and effect relationships. Further, as Erlandson et al. (1993) noted, each naturalistic research setting is a vast web of unique interrelationships. Both of these influences act to restrict the generalizability of research findings to other settings (p. 16). As Cronbach (1975) also suggested, individual differences, the complexities of social interaction, the ability to learn and thus change, and the specifics of social context limit the ability to generalize social science research findings, particularly over time (pp. 36-38). However, experiences and interrelationships which are "thickly described" permit the transfer of understandings across social contexts in the form of working hypotheses. The detailed description and interpretation of instructor accounts communicated

through this study should inform readers' understandings of the phenomenon of CMC instruction as it applies to their own settings.

Schwandt (1994) noted that all naturalistic enquirers fundamentally "... watch, listen, ask, record, and examine" (p. 119). My main activities in this study were the same. A detailed description of the study's research process is described below. This includes a description of the information sources used, the method of information collection and interpretation, and procedures used to provide trustworthy research findings.

Information Sources and the Information Collection Process

Three general sources were used to gather information for the study. First, and to provide possible entry points for conversation and references for examples, I reviewed transcripts of instructor messages in all computer conferences for one course per instructor as well as applicable course outlines and limited amounts of instructional material to obtain a better understanding of the structure and content of the instructors' courses. Second, I developed field notes and a diary. Third, multiple in-depth, unstructured interviews were conducted with participants who could talk knowledgeably about their own experiences with and understandings of CMC learning environments. Information about the participants is provided below, followed by more detailed descriptions of the various sources of information and the information collection process.

Participants

I interviewed six instructors in this study – two women and four men. The instructors were selected purposively from two CMC-based graduate-level programs at Access University[3] – the Master of Education (M.Ed.) and Master of Commerce (M.Comm.) programs. This was done for three reasons.

1. I hoped that limiting participants to instructors of graduate-level university students (and not including college nor K-12 educators, for instance) would provide some focus for the instructors' experiences to the extent that these may have been influenced by level and type of curricula and student characteristics like age and intellectual ability.
2. The M.Ed. and M.Comm. programs have some underlying commonalities – for example, governance, graduate student admission standards, university mission statement, and distance education focus – which in turn may reduce variations in instructors' understandings that are influenced by differences in institutional culture, philosophy and educational mandate. These are not the primary areas of interest in this study.
3. I have previously established professional relationships with all of the instructors interviewed in this study. I believe that this produced more full and frank discussions of the issues which arose during the course of the research.

As well, I chose instructors who I felt had diverse backgrounds, perspectives, and experiences, who expressed an interest in the research topic, and who were willing to be interviewed. All of the instructors but one taught exclusively at the graduate level at the time of the interviews.

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[3] The name of the educational institution, its faculties and other administrative departments, and its

Over the last two years, computer-mediated communication was the principal teaching mode of all the interviewed instructors. Three of the instructors had spent the majority of their careers with the University. The other three had held research, teaching or administrative positions with other educational institutions for most of their careers prior to coming to Access University. Four of the instructors had been involved with their respective graduate programs since inception. Two other instructors had begun to instruct in their particular programs just prior to the first or second intake of students.

Backgrounds of each of the instructors are briefly described in the accounts of their experiences in the following chapter. Research procedures specific to each information source are described below.

Review of Computer Conference Transcripts

Owen (1982) noted the importance of using multiple data sources in naturalistic enquiry (p. 13). Henri (1991) suggested that conference transcripts could provide a "gold mine of information concerning the psycho-social dynamics at work among students, the learning strategies adopted, and the acquisition of knowledge and skills" (p. 118).

In the original proposal for this study, transcripts of some instructor and learner messages from the applicable computer conferences were to be used for similar, but instructor-centred, purposes. I hoped that this review of the computer conference transcripts would serve four purposes – to provide information about the way conversations were structured in the computer conferences, to inform the types of questions asked during the second round of interviews (e.g., "What did you think when student X said this?"; "Why did you reply to this posting, but not to this one?"), to act as

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various programs have been changed in this study to maintain confidentiality.

ready-made sources of instructors' experiences, and to compare instructors' stated accounts of their experiences with their apparent actual practices.

In practice, the sheer volume of this undertaking was daunting. To limit the review of computer conference transcripts to a manageable amount of work, I chose to read conferences in only one course offering per instructor. Even on this basis there were about 5,000 messages to be read in a total of 22 conferences. To reduce workload further, I decided to scan the headers of all the conference messages in the selected courses to identify instructor postings. I read only these. There were 685 instructor messages in total that I reviewed. I also read any related student messages if these had direct relevance to a particular instructor's postings – for instance, if I felt that this was necessary to clarify context, or if the instructor's message referenced a prior student message.

I made notes about various aspects of the messages, including content in some cases. I also counted the relative number of contributions by instructors compared to students. Generally, though, I was interested in the nature of the instructor interaction evidenced in the message – for instance, its "tone," whether the message encouraged discussion or provided explanation, whether the instructor addressed one point or instead summarized and synthesized several student contributions, and overall patterns of participation (e.g., whether there more frequent instructor interactions at the start of the conference). These impressions were noted on the applicable instructor's second round-interview sheet for discussion.

I did not find the conference transcripts to be particularly useful for the third and fourth purposes noted in the proposal – documenting significant instructor experiences, and comparing these to their stated accounts. I found that the review of these portions of the computer conference transcripts at best raised questions in my mind about what the instructors might be experiencing at the time, but did not provide more substantive information because I was not aware of the context surrounding the instructors' messages I read, in most cases. The conference transcripts seemed to be the result of often-complex thought processes, and based on various preceding student messages and interactions, instructors' prior experiences, and the subject matter of the various courses, for instance. To understand these factors required a probing discussion with the instructors that I found could only be accomplished through dialogue. Owen (1982) noted that

> one cannot understand human behaviour without understanding the framework within which the individuals under study interpret their environment, and this, in turn, can best be understood through understanding their thoughts, feelings, values, [and] perceptions. (p. 5)

The unstructured interview process, with its ability to dynamically engage the instructors in dialogue about what they did and what they perceived, was a more robust and useful research vehicle in the end, in my opinion. As noted, though, the conference transcripts did flag some issues for follow-up in the second-round of interview questions.

Field Notes, Diary, and Other Documentation

I found that I needed to familiarize myself with some distance and adult education literature before I started the information collection and interpretation process because my prior education was business-related. I was not trained as a distance and adult educator. I had some experience with correspondence-style distance education, and limited experience with CMC.

However, I did not want to impose my understandings on the instructors' experiences prematurely. I found that the process of reviewing the CMC, distance and adult education literature and reflecting on my own understandings of the CMC environment helped me to identify the evolutionary nature of views about CMC and the distance education process, to understand alternative perspectives that seemed to inform some of the literature applicable to this study, and to identify my own often unrecognized assumptions about the nature and practice of distance education, including CMC. Although I attempted to suspend my own perceptions during the interview process, I did engage in reflective thought during this time. To aid in this process, I maintained a diary and a set of field notes.

In the diary, I recorded thoughts about potential underlying issues, themes or connections that occurred to me as I reviewed the literature or talked with each instructor, or which arose as I reflected on the contents of the interview and computer conference transcripts. The diary also served to document the progress of the research. As well, I kept field notes of the interviews and other matters which arose in the course of the interviews – information about the dates and places of interviews, my impressions of the instructors after each interview, and the circumstances surrounding a particular interview process, for instance. These information sources were useful in analyzing the instructors' accounts, and some of the thoughts that I recorded in them were also incorporated into the findings of this study.

Gathering information "on-site" was difficult because of the virtual nature of the CMC environment and the dispersed locations of the instructors. However, I used e-mail to communicate informally with the instructors, and to keep up with developments that might be of interest to my study. E-mail also allowed me to keep the instructors updated about the study's progress, and seemed to enable me to extend my time as a participant in this (virtual) setting. I found that these exchanges were efficient, to the point, and often useful. My ongoing working relationship with some of the instructors also helped the research process, as I found I could discuss matters informally with them by telephone, for instance.

I retained copies of e-mail messages, along with computer conference transcripts, verbatim interview transcripts, the analyzed and re-arranged interview transcripts, memos, and other relevant information in several large binders organized on an instructor-by-instructor basis, except in two cases where the applicable computer conference transcripts were read and stored electronically.

The Interview Process

Prior to the first interview, I contacted the instructors by e-mail or telephone and invited them to participate in the study. I explained the nature of the research in general terms. When they agreed to take part, I sent them a letter outlining the process in more detail, including some broad possible topics for the interviews (see appendix A). I again reviewed the anticipated process with the instructors when I contacted them to set up the dates for the initial interviews.

Each of the instructors was individually interviewed and taped on two separate occasions. A total of 12 interviews were conducted between April and August, 1996. The interviews lasted between 60 and 90 minutes each. For the first round of interviews, the instructors were interviewed in private rooms at their places of work to eliminate distracting phone calls, etc., except for one interview which was conducted in the instructor's home. All but one of the second-round interviews with each instructor were conducted by telephone because these were more convenient for the instructors, given their busy schedules and lack of physical proximity to me in most instances.

I found the telephone interviews to be more productive for several reasons. By the time they took place, I had analyzed the initial round of interviews extensively, had a better sense of the particular instructor's point of view, and could ask more probing questions. The lack of face-to-face contact allowed me to make more notes without distracting the participants. It also seemed to allow a franker and deeper exchange of views, because we could concentrate on our words. We were not as self-conscious about appearances, and did not have to be concerned about maintaining eye-contact or providing other non-verbal cues. The instructors were more familiar with me and the interview format by that time, and had been able to think about their comments made in the first interviews in the meantime. Finally, I sensed that my personal relationship with each instructor had deepened as a result of the first round of interviews. The instructors seemed more comfortable.

Prior to the first round of interviews, I had sketched out several broad kinds of questions that I intended to use to initiate or maintain dialogue during the course of each interview. Topics included personal background, reasons for interest in CMC, impressions of their students, and particularly good or bad experiences with the medium. Specific examples of informing questions were noted in chapter 1. Other questions were informed by my review of the literature. These were related to strategies that instructors used to enhance student learning experiences at a distance and to control or guide interaction, the effect of computer conferences on teaching styles, and workload comparisons between computer conferencing and other, more traditional distance- and classroom-based teaching duties. My initial questions were broad and open (e.g., "Could you tell me about your educational background?"). Responses to these questions formed a basis for more focused discussions during the second set of interviews.

By nature, I tend to listen more than I talk. I found that my comments during the interviews were generally limited to posing initial questions, interjecting with encouragement, summarizing and clarifying the instructors' comments, and asking follow-up questions. The instructors did most of the talking, but usually near the end of each interview I tried to summarize some my thoughts on the major themes we had discussed, or differing points of view we had jointly explored. I solicited the instructor's feedback on these.

After each interview I felt a sense of accomplishment (and fatigue). The unstructured nature of the interviews seemed to allow the instructors to open up and discuss experiences that were personally meaningful to them. It seemed at times that these thoughts had been pent-up within them, and that the interview process allowed them to finally talk to someone about their experiences or related issues that deeply interested or concerned them. A few instructors voiced these sentiments after the interviews had ended.

After the first round of interviews, the discussions were transcribed by me or a typist. The transcripts were checked against the tapes of the original interviews to verify their accuracy. These transcripts were then sent to the instructors as applicable, some of whom slightly amended and clarified their original comments. After these changes were incorporated, each of the instructors approved the final transcripts of their first-round interviews.

I began the interpretation process after the initial interviews with the first two instructors were completed. Their interview transcripts were reviewed and divided into units of thought ranging from one sentence to a few paragraphs in length. The interview and page numbers, as well as summary descriptions were added to each of these units of thought. As Glesne and Peshkin (1992) recommended, these were rearranged into a broad, preliminary outline based on initial themes and patterns suggested by the information (p. 130). New, broader categories of experiences arose from this process, which informed the first-round interviews with the remaining four instructors. A common terminology was developed to describe the outline headings in each of the six separate sets of re-arranged transcripts, to facilitate later study.

Individual first-round transcripts of all the interviews were iteratively rearranged to fit into this evolving common outline as the analysis of the other first-round interviews proceeded. Rearranged transcripts of the first-round interviews were kept in six separate files, one for each instructor. However, the common outline structure was very large because this analysis was only preliminary and the outline headings were based on topics that had arisen across all the first-round interviews. Some of the outline headings for a particular instructor's transcript had no units of information included because this area had not been discussed. These gaps were used to identify broad areas for further discussion with the instructors during the second-round interviews.

I also obtained and reviewed computer conference transcripts of on-line courses taught by each instructor to inform the second round of interviews. These interviews were then conducted, transcribed, checked by me, and approved by the applicable instructor in the same manner as the first set.

The transcripts from each interview were again assigned summary descriptions. New categories of meaning emerged during the analysis of the second round of interviews. These new categories and their associated units of thought were again incorporated into each of the six individual instructors' files in such a way that a common outline structure was maintained across all participants' files. Eventually each of the six individual instructors' files contained the rearranged transcripts from both of their interviews, in an outline form using structure and descriptions that were common to all the instructors' accounts. I prepared individual, condensed accounts of each instructor's experiences from the applicable rearranged transcripts. These accounts described their backgrounds, the applicable structures of the courses they taught, and their computer conference interaction styles and preferences, among other information. These descriptions were about 4-6 pages in length, and like the interview transcripts, were forwarded to the applicable instructor for review, comment and approval.

The six separate sets of interviews were also combined into one file, using the common outline form. I then analyzed this combined data, and continued to rearrange and combine the various sections into a more coherent whole. Because each broad heading now contained the relevant thoughts of all the instructors, I was able to identify what I initially considered to be significant areas of the instructors' experiences and perceptions – instructional time demands, student empowerment and the de-emphasis on "teaching" some instructors experienced in the computer conference environment, how they dealt with student misunderstandings and related problems, the purposes of student participation in computer conferences, the value of student interaction, and how the instructors maintained dialogue among participants, for example. I summarized the various instructors' accounts of these topics and disguised the participants' names. I forwarded copies of this summary to all of the instructors for their comment at the same time that I sent the summary of their individual accounts to them, in December, 1996. The instructors were individually informed of their pseudonyms to facilitate their review of the summarized accounts. Their corrections and clarifications were incorporated when I received them about one month later.

On the advice of my advisor, and following her review of the above-noted material, I read all the interview transcripts again and added about 50 pages in total to the descriptions of the individual instructors' accounts. I sent these expanded accounts to the each instructor in April, 1996 for review, clarification, and approval. These form the basis of the instructors' accounts included in the following chapter.

In retrospect, the analysis process was time-consuming and cumbersome. I initially felt that I should concentrate on combining the six instructors' accounts into one document, so that I could more easily summarize the similarities and differences in the accounts and make the interpretation process more efficient. However, I ended up categorizing and re-arranging units of information from each set of instructor interviews several times in order to maintain a common outline structure across the six sets of instructors' interviews. I also had to re-analyze the interview material several more times when I expanded the individual accounts.

Despite the length of time devoted to the transcript analysis process, this procedure did provide an incentive for me to review the transcripts shortly after each interview, and also to begin the writing process early. As Glesne and Peshkin (1992) noted, these are advisable practices in naturalistic enquiry (p. 149). This process made me more familiar with the content of the interviews as well, and when combined with the use of the computer conference transcripts, field notes, and diary described earlier, helped me to think more deeply about underlying aspects of the instructors' experiences.

The instructors' experiences and my reflections on these are described in the following chapters. Before proceeding, though, procedures used to validate the information collection and interpretation processes are described.

Planning for Trustworthiness

Guba and Lincoln (1982) noted that reliable research findings in naturalistic enquiry must have four major characteristics to be deemed *trustworthy* – credibility, transferability, dependability, and confirmability (p. 246). Explanations of these characteristics and the respective methods that were used to produce trustworthy findings in this study are described below.

Credibility

Truth value is the measure of confidence that can be attached to a study's research findings. Since my research design did not seek to establish any cause and effect relationships, measures were used which provided the research findings with *credibility*. Each of the instructors reviewed and approved two sets of interview transcripts, the summaries of their individual accounts, and the combined summary of the all the instructors' accounts, arranged on a topical basis.

Transferability

Transferability in naturalistic enquiry is the degree to which particular research findings can be extrapolated to other settings. When dealing with people, particularly in the manner used in this research, it is more difficult to generalize findings because individuals' understandings are assumed to be subjective and context-dependent. Instead, findings can be more effectively applied to other settings if there is adequate understanding of the contexts in which the participants work. These measures contribute to the *transferability* of research findings. Thus, the study contains descriptions of relevant aspects of Access University's applicable graduate programs, features of the CMC systems used in the M.Ed. and M.Comm. programs, and some background information about the instructors. Most importantly, the instructors' accounts have been "thickly described" in an attempt to more fully communicate to readers the individual context of each instructor's experiences. This will hopefully assist them in drawing their own conclusions from the research and applying the findings to other CMC settings.

Dependability

Guba and Lincoln (1982) noted that research design in naturalistic enquiry is anticipated to be emergent (p. 247). As discussed at the start of this chapter, multiple, changing understandings on the part of the instructors and myself, and a natural, uncontrolled research setting were assumed for this study. These factors prevent exact replication of the study. However, after allowing for conscious change to the ongoing research design in naturalistic enquiry, *dependability* is achieved when the design stabilizes. The extent of information collection and interpretation procedures described earlier, incorporation of relevant literature into this process, my increasing familiarity with and reflections on the information sources, and my supervisor's reviews of various drafts eventually solidified the research design and added dependability to the results of this study.

Confirmability

This study does not purport to be objective. *Confirmability* of findings refers to a qualitative concept of intersubjective agreement and not a quantitative one, since general agreement of instructors on a subjectively-perceived reality (which may change) is assumed here.

Glesne and Peshkin (1992; pp. 146-47) described several techniques which add confirmability to naturalistic enquiry. I used the following: I maintained an extended electronic presence with the instructors through the use of e-mail. I continued to have personal contact with the instructors, and discussed the general progress of the research and some of their ongoing experiences with the CMC medium. In some cases, the instructors continued to intermittently discuss issues that had arisen in various interviews. Second, and as previously noted, interview transcripts were reviewed and approved by the applicable instructor. Summaries of the individual and collective accounts were also reviewed by them.

Ethical Considerations

A number of procedures were used to ensure that appropriate ethical standards were maintained during the study. The research proposal was submitted to and approved by the Ethics Review Committee of the Department of Educational Policy Studies prior to the commencement of the research, as required by University of Alberta policy.

Permission was obtained from the instructors and their educational institution to review selected computer conference transcripts. The participating instructors were asked to inform students in their courses about the nature of my research and to explain that the purpose of my review of the transcripts was to study instructors' interactions. No negative responses were received from students. No information contained in the computer conference transcripts that could be used to identify individual instructors, students or the content and nature of specific computer conference messages has been deliberately reported in the study.

Although I was known by the participants prior to the study, I had not developed any social or personal ties with them. Instructors were informed of the nature of the study, and voluntarily agreed in writing beforehand to participate in the research. Participants were able to withdraw from the study at any time, or clarify or rescind their comments. As described earlier, transcripts of the interviews and summaries of individual accounts were sent to the instructors for their review and approval, and a summary of comparative perspectives was also sent to the participants for their review and feedback. Names were changed in this account.

The participants' identities were protected in the reporting of the research by changing their names, the names of their graduate programs, and the name of their educational institution. Additional descriptive information about the instructors' backgrounds, programs and educational institution has been presented in only general terms.

The opinions and other information obtained during the course of the interviews were treated confidentially. I did not deliberately disclose the names of the participants to anyone. During the course of the study, I only discussed the nature of my tentative conclusions in general terms with the instructors or other individuals besides my supervisor.

The taped interviews and supporting documentation will be destroyed after the dissertation process is complete. I believe I have sufficient knowledge about research methods, procedures and risks of this study, and the ways in which the results may be used. As a result of the foregoing, I believe that this study has been conducted in an ethical manner.

Summary

The philosophical orientation of the constructivist paradigm was discussed at the beginning of this chapter, followed by a description of several assumptions about research conducted in this paradigm – assumptions about reality and truth, common understandings, values, and the generalizability of research findings. A naturalistic research design informed by these tenets was described, followed by details of the research process particular to this study. The instructional experiences of six instructors involved with two different CMC-based, graduate-level programs at Access University were studied over an approximately five-month period. During this time, two unstructured interviews were conducted with each participant as the main means of gathering information. Transcripts of these interviews and individual, detailed summaries of the individual instructors' accounts were reviewed and approved by the participants as applicable. In addition, the instructors were asked to review a comparative summary of significant areas of their CMC experiences. Computer conference transcripts from one course per instructor were reviewed to inform the interview process. Field notes and a diary were maintained to record my thoughts about the instructors' accounts and document the progress of the research.

Procedures which contributed to the trustworthiness of the research findings, safeguarded the participants' anonymity, and promoted the ethical conduct of this research were also noted. The following chapter provides a detailed account of the instructors' experiences arising from the information collection procedures described above.

Chapter 4

DESCRIPTIONS

The experiences of six CMC instructors in the M.Comm. and M.Ed. programs at Access University are described in this chapter. First though, the two graduate programs are reviewed to provide context for the individual instructors' accounts that follow.

Contexts of the Participants

The distance-based Master of Education and Master of Commerce programs offered by Access University commenced in 1994. There are several similarities between the programs. For instance, both are graduate programs and use CMC as the predominant means of communication. However, there are also significant differences between the programs, including their administrative structures and the electronic learning systems they use. Significant features of each program are described in the following sections.

The Master of Education Program

The Department of Education Studies (DES) was established as an administrative unit within Access University in 1985. It initially concentrated on institutional research related to distance education, but was also charged with developing a graduate program in distance education. This program, the Master of Education (M.Ed.), commenced in September, 1994. The M.Ed. program is offered entirely at a distance. There is no on-site course work involved in the program.

To be admitted into the program. prospective M.Ed. students are required to hold a 3- or 4-year baccalaureate degree from a recognized post-secondary educational institution. As of September, 1996, the majority of students were K-12 teachers (18%), college or university instructors (22%), or held administrative positions with an educational institution (17%). The remainder held various positions in the public and private sector. About 70% of the students resided in western Canada or the Northwest Territories, although the program has students in all provinces except Quebec. About 53% of the students were female and slightly over one-half of the students were between the ages of 35 and 44.[4]

The M.Ed. program consists of five core courses, four electives, and a thesis or project. The core courses are primarily intended to develop student skills in designing, developing and evaluating distance education courses, programs and systems. Electives allow students to specialize in certain topic areas or improve their skills in distance education research. Students may also do independent study courses as part of their electives. Courses commence in September, January and May of each academic year. They are fifteen weeks in duration, except the May offerings which typically run eight weeks.

At the time of this study, courses in the M.Ed. program generally used an older version of CoSy, a UNIX-based conferencing system. UNIX-based mail (Pine) and file transfer applications were also provided to students.

Using CoSy, M.Ed. students can stay on-line to make e-mail or conference contributions or write off-line, and upload or download messages. The learning system does not have a graphical user interface, and generally requires the use of text-based commands. These commands vary among the different CMC applications, and a number of steps are needed to carry out certain tasks like transferring files among students. Many M.Ed. students opt to use their own personal computer-based e-mail, file transfer and communication software provided by their Internet service providers (ISPs).

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[4] Based on information provided to me by the M.Ed. program director.

UNIX-based applications were initially chosen for the M.Ed. electronic learning system because these were already in use at the institution and could be made available to students without charge. These applications could also be accessed through students' local ISPs. This was an important factor in choosing CoSy as the program's conferencing software, since most M.Ed. students already had some form of Internet connectivity through their places of employment or local ISPs. They could access the M.Ed. learning system in this manner, or through a long-distance telephone connection.

Prior to the commencement of the M.Ed. program, alternative microcomputer-based conferencing systems did not have Internet connectivity and therefore required students' computers to connect on-line with a central server. As a result, many students would have incurred long-distance charges. Microcomputer-based CMC software was also ruled out because technical support for M.Ed. students is provided by the University's Computer Technology department, and this type of software was not supported at the program's inception.

Student problems and enquiries are initially handled by the appropriate faculty member. Instructional material is generally paper-based, and distributed to students at the start of their courses. The M.Ed. electronic learning environment did not easily allow the use of other on-line activities such as questionnaires, self-assessment material, or computer-based forms of instruction at the time of this study.

Each course in the M.Ed. program usually has several separate computer conferences to discuss topics specified in advance by the instructors. Often the specified topics are directly related to assignments that students are required to submit as part of the course requirements. A few courses require students to initiate and moderate their own conferences. Students are also able to set up their own conferences if they wish. A "med.talk" conference is open to all students in the M.Ed. program and is made available for students to discuss topics of their own choosing. A "med.help" conference has been established by M.Ed. students to assist other students with technical problems, and "med.general," "med.students," and "med.careers" conferences give students a place to discuss general issues about distance education, to talk about M.Ed. thesis or project issues, and to post distance education-related job opportunities, respectively. At present, faculty are permitted to join these conferences.

The Master of Commerce Program

The Master of Commerce program commenced in the early 1990s. It is a distance- and predominantly CMC-based business program. The program is administered under the auspices of the Institute for Commerce (IFC). The IFC is a semi-autonomous administrative unit of Access University. Its offices are located about one hundred miles away from the main campus. It controls all its own financial resources and has the ability to hire its own technical staff, academics, and academic assistants. As with the Department of Education Studies, the reporting lines for the IFC are through the Vice-President, Academic.

About 70% of the students in the M.Comm. program are male and about 71% of the students are from Western Canada. The balance of students are from other Canadian regions. About 60% of the students are employed in the private sector; the balance are employed in government or not-for-profit organizations. Students are generally between 35 and 45 years of age, married with children, and in management positions earning between $40,000 and $50,000 per year. On average, and depending on gender, students have between nine to eleven years of management experience.[5]

Prospective M.Comm. students are required to hold a recognized degree from a college or university or an accepted professional designation, and have from three to five years of supervisory, professional, or managerial experience. Alternatively, a student can be provisionally admitted to the program without a degree or professional designation until several introductory courses are completed and a comprehensive examination is successfully written.

Students move through the M.Comm. program in cohorts as in the M.Ed. program. The academic year commences in September. Courses are taken consecutively, and no more than one at a time, and are from six to eight weeks in duration. M.Comm. students must also attend yearly on-site classes over two weekends (16-20 hours each) and one summer school of seven working days duration during their program. A primary purpose of these on-site sessions is to establish group cohesion and facilitate instructor and student interaction. Students are required to successfully complete comprehensive examinations at the end of phases 1 and 2 of the program, and a project-based dissertation after phase 3 electives have been completed.

Similar to the M.Ed. program, M.Comm. program designers considered computer-mediated communication to be a central component of the distance education experience in order to provide graduate students with opportunities to interact with each other and their course professors. A microcomputer-based software program – Lotus Notes® – was selected as the electronic learning environment, primarily because of its ability to support many types of learning activities and levels of student interaction through its flexible database structures.

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[5] Based on information provided to me by the M.Comm. program director.

A consistent graphical user interface provides all electronic communication functions like e-mail, computer conferencing, and assignment transfer, as well as access to library and similar external databases and specified World Wide Web sites. Notes® runs under Windows and Macintosh operating systems (although the M.Comm. program now only supports Windows).

Notes® is primarily designed for use as an "off-line" communication system. Students connect asynchronously to a remote server through direct dial-up to modems attached to the central server, or through local ISPs. When an on-line session commences and the central server and student computer connect, new information contained in various databases is exchanged. The computers automatically disconnect afterward. Students generally read and respond to conference and private e-mail messages off-line. Their computers automatically reconnect to the server at the end of the session, whereupon updated database information is exchanged. This process generally takes only a few minutes, so that connection time and long distance charges are minimized for students who choose not to use ISPs.

E-mail, computer conference contributions, assessment material, student assignments, and other data are contained in separate databases which can be flexibly designed to support various types of information, access levels (e.g., read-only) and communication patterns (one-to-one, many-to-many). Some databases contain instructional material. Others enable students to complete individual learning exercises or take part in computer conferences. An "Academic Help" conference guarantees students one-working day response to questions posed to an academic facilitator. Non-academic issues (for example, problems with hardware or software operation) are posted to a "Help Desk" conference, and responded to by technical staff hired by the Institute for Commerce. These latter two databases are common to all courses.

Other computer conference databases are used selectively within individual courses. As examples, some conferences are designed to allow students to pose questions for debate or discussion outside the established course conferences set up by the instructors. In some courses, students have access to databases containing self-assessment material to check their understanding of course concepts, and reflective questions which are designed to integrate theoretical concepts with students' life experiences. Students also discuss and sometimes jointly complete on-line case studies of real or simulated business situations which are contained in other databases. Some courses use electronic surveys or other instruments which students complete themselves, or administer to managers or employees of firms, for example. These can then be submitted and aggregated electronically, and the results disseminated to course participants.

A typical M.Comm. course consists of a series of electronic lessons to be covered in approximately one week each. Related instructional material and readings are generally distributed electronically to students as permitted by copyright. Pop-up boxes within the on-line material are used to define glossary terms or provide ancillary information. Various parts of the on-line material and interactive activities are linked through on-screen buttons or other hypertext features. A browser supplied with more recent versions of the software provides access to external World Wide Web sites.

Besides the faculty members, the M.Comm. program employs non-faculty student advisors. These advisors monitor on-line student activity in various courses and contact students who do not appear to be participating. They are also available by telephone to provide technical or administrative assistance to students for several hours during the day and evening or through e-mail twenty-four hours a day. The student advisors act as conduits for complaints or concerns voiced by students who may wish to remain anonymous to the relevant course professor. They also screen students' calls and forward academic or more difficult administrative issues to the applicable instructor.

Differences Between the M.Comm. and M.Ed. Programs

Although both the M.Comm. and M.Ed. programs have a common institutional history and mandate, and provide asynchronous electronic, distance-based graduate education to adult students widely dispersed throughout Canada, there are significant differences between the programs.

The M.Comm. program generally uses separate marketing, course production and distribution, registry, and computer support services which are either purchased from third parties or performed by personnel employed directly by the Institute for Commerce. The Institute maintains separate offices from the rest of the University. The IFC operations are funded almost exclusively from program fees which total about $20,000 per student. These are significantly higher than the M.Ed. program fees.

The Department of Education Studies is located in the main offices of Access University. The M.Ed. program is not charged for office space, marketing, registry, or computer support services (including student technical support) provided by various other departments within the University. Course material costs are charged back to the M.Ed. program at an internal rate. The Centre is funded out of base revenue, which covers the full-time faculty and staff salaries. These individuals contribute in-kind support to the M.Ed. program. As well, tuition fees are transferred into the M.Ed. budget monthly, to cover related program costs like course materials and payments to some part-time instructors.

At September, 1996, the M.Ed. faculty consisted of four tenured or tenure-track members (including the director) who worked full-time for the Department of Education Studies, two faculty members seconded from other units on a part-time basis, and one external, part-time instructor hired under contract. The M.Comm. faculty consisted of one non-tenured director and two members seconded from other administrative units in the University on a full-time basis. The remainder were external, part-time instructors under contract.

The two graduate programs also use different CMC platforms, as described earlier. Electronic class sizes in the M.Comm. program are somewhat larger than those in the M.Ed. program, primarily because of the use of student advisors in the M.Comm. program and the larger number of students enrolled in the program. The course instructors handle all of the administrative and instructional matters that arise in the M.Ed. program, although technical problems are referred to the Computing Technology department. The M.Comm. program also runs several weekend schools and a yearly summer school at various Canadian locations, where students and instructors participate in intensive face-to-face sessions. The M.Ed. program has no required face-to-face component.

The descriptions of the two Access University graduate programs applicable to this study provide context for the instructors' descriptions of their experiences. These are described in the following section.

The Instructors' Stories

As noted in chapter 3, the described experiences of the six instructors which follow were primarily constructed from the transcripts of two interviews conducted with each instructor. These accounts are the major focus of this study.

During my analysis of the interview transcripts, several major categories of description emerged. As a result, the individual instructors' accounts are arranged in a somewhat similar order. They include a brief personal and educational history; a description of the on-line course or courses instructed – for example, number and type of assignments and computer conference activities, and overall grade weight attached to various components of the course or courses; personal motivations to teach in the CMC environment; educational philosophy; instructional preferences and techniques; comparisons of on-line experiences with prior experiences in traditional distance- or classroom-based education; impressions of student participation and behaviour; the nature of the instructor-student relationship; methods of assessing participation; and on-line marking techniques.

Content coverage and relative emphases vary somewhat among the accounts because of differences in importance that the instructors attached to these experiences, the somewhat artificial and arbitrary nature of the categorization, and the unstructured nature of the interviews. The accounts are presented in random order.

John

At the time of the interviews, John taught one course two times per year in the M.Ed. program. The course is an elective designed to give students an overview of various types of newer educational technology and their appropriate uses. John had taught the course four times prior to our interviews. There were approximately 15-18 students in each offering.

A textbook and a set of readings were the primary instructional resources for his course. Since John considered formal, written assignments to be valuable means of developing certain student competencies and assessing the extent of their learning, two written assignments were required, worth 70% of the final mark. There were originally three assignments. This number had been reduced to two to allow computer conference participation to be weighted more heavily.

Of all the computer courses taught by the interviewed instructors at the time of this study, John's course had the highest grade weight for computer conference participation. Participation in the four computer conferences had been increased from 10% to 30% of the final mark. He had done this for two reasons. First, he felt the higher grade weight more accurately reflected the amount of effort students put into the conferences. Second, he felt that greater weight tended to increase participation and thereby improve the students' learning experiences. He hoped to increase the participation weight to 50% of the total course grade in the future, but felt constrained by other instructors' practices of awarding lower percentages of course grades for computer conference participation. He sensed as well that some students would object to having this much of their course grade determined by on-line activity.

He taught this course for several reasons. It kept him up-to-date with technical innovations and theoretical developments. The interaction with the graduate students was also enjoyable. He was not motivated to teach this course for the money, finding that the time needed to instruct effectively in a computer conference environment was substantially greater than that for which he was remunerated. John considered the workload demands of computer conferencing to be two to three times higher than conventional classroom instruction.

John had grown more comfortable with teaching on-line as he became familiar with the electronic learning system and developed his own personal style of interacting in the environment. However, because he did not reside near Access University, he felt especially isolated from his colleagues. He expressed a desire to meet more often with other instructors to discuss the M.Ed. program and the particular issues he faced and to learn from others' experiences. He remarked,

> I'm not in what you'd call a collegial environment where we sit down around coffee and have a chat about "How are your students finding your courses?" I don't have the benefit of that like I have

> had in other faculties. . . . I'm really in isolation, but because I've got so much teaching experience I feel really comfortable. Man, if I was a neophyte to this thing, I think I'd be really scared about what's going on. (Int. 2, p. 17)

John felt that personal experience and individual research and investigation were valuable methods of adult learning, but that learners needed to actively and freely participate in the learning process through dialogue to create new, shared understandings. He considered the primary purpose of the computer conferences to be the provision of a classroom-like seminar experience to students at a distance – a place to create conversations about life experiences they brought to the course, concepts and ideas that may have arisen from the accompanying instructional material, or issues John raised himself. Thus, he viewed computer conferencing as a place for students to "bat ideas around." He stated,

> I really believe that learning is a process, it isn't an end. The whole idea of my conferences is to allow students to experience. I believe so much in the fact that most of their learning and understanding comes through their experience of interaction – experience with ideas, a sort of playground. That's why I treat the conference the way I treat it and why I give it so much weight, because I come from that point of view. I do all the behavioural kinds of things that the behaviourists [do]– I do that in the background by setting certain assignments, outlining certain objectives, and having a certain marking guide that I use to look at certain assignments. But for the most part the conference, to me, is built around a perspective of that process. . . . It's evolutionary. . . It doesn't have a beginning and an end. (Int. 2, p. 5)

John took a "hands off" approach to computer conference instruction, which he thought was much like his classroom teaching style. He did not structure the conferences around the discussion of assignment topics necessarily, though some concepts used in the assignments were also discussed in the conferences. Creating a relaxed atmosphere was important for interaction he found, because "I've never been able to get people to talk when they've been stressed out" (Int. 1, p. 12).

Part of this involved consciously forcing himself to do more listening. He found that being more active in the conferences tended to stifle contributions from some of his students who had extensive teaching or life experiences. He explained,

> When I first started doing [computer conferencing] I tended to be more active in it. I tended to make more comments. . . . [Now] I'm beginning to learn the power of silence. The power of silence is more timing than it is how much or how little silence is there. Now I tend to be a lot better at the timing. I probably participate less, but more powerfully. (Int. 1, p. 19)

John noted that this less-frequent, participative role was not accepted by some students. These students wanted him to contribute more direction and expertise to the conferences because "they think that's what they're paying for, that there's some kind of expert on the other end or something" (Int. 2, p. 13). However, he used their objections as triggers for discussing views about the purposes of CMC. He noted,

> Some of the students are looking for a lot more input from me. Some of them find it a bit frustrating that I don't engage more in the conversation and supply them with so-called "information and knowledge." . . . We usually have a discussion at that point because it happens in every seminar. We start having a discussion about the validity [of whether] I or should I not do more of that. It sort of plays right into my agenda. (Int. 1, p. 5)

John stated that he had no real "awakenings" as a computer conference instructor, though he felt at times that he still needed to change some of his instructional practices – in particular, to summarize discussions and weave disparate threads of conversation into a more coherent whole. He found that both his on-line and classroom instructional practices were informed by his experiences as a public school teacher. For instance, John believed that some aspects of the learning environment had to have structure to make the overall experience effective. Setting rules at the outset of any type of course had always been one of his most useful teaching techniques, so he applied this principle to his computer conferences. He commented,

> When I started teaching school, an old school teacher told me, "You always start off with the rules. You always start off tougher

> than you'll end." I've always had that sort of tone about my teaching. I always try to be fairly upfront at the beginning of any teaching. If I'm going to be formal or tough or lay down any kind of expectation, I'll do it at the beginning and then work away from it. It's just a technique. It doesn't come from any particular [theory]. I know it's sort of antithetical to my [overall educational philosophy], but it is a thing that I've learned to use and I've found it successful, so it's one of my tools. (Int. 2, pg. 9)

However, he was flexible when it came to the application of these rules. He stated,

> I always have these rules. Everything has to be in on time or you lose this, that, and the other thing. I never tell them that I'm flexible on that but if they come to me and really do require flexibility, then I'm more than accommodating. But I don't advertise that I'm accommodating. (Int. 2, p. 15)

He also found it useful to briefly outline a general framework for appropriate forms of interaction in his conference message at the start of each course. In one conference, he told students to "participate freely, stick to the topic, treat each other kindly, and please keep your comments succinct." He also stated in this message that he preferred limited, but thoughtful comments over frequent, less-analytic comments. However, to encourage regular reading and participation in the conferences, he informed students that he expected them to make four to six comments a week.

He also projected limits about acceptable forms of debate. He remarked,

> The only thing I don't have any tolerance for is abuse. I've had very little and I think [students] pick that tone up from me right off the bat. You can say anything you want and you can challenge anyone's ideas including mine, but you do it in a pleasant way. (Int. 1, p. 20)

When he did encounter overbearing students, he felt he needed to challenge them to encourage other students not to be intimidated, to keep the conference discussions going, and to diffuse potential confrontations. However, he had not experienced many problems in this regard.

John used several other methods to develop interaction in his conferences. He preferred to provoke thought by noting a point that had not been brought up, by slightly disagreeing with a contribution, or by making public, encouraging statements to particular students about their postings. Although he was reluctant to provide overt direction to the conferences, he would direct the on-line discussions into certain areas if he felt important issues raised in the instructional material or what he considered to be significant learning objectives were being overlooked.

He also performed basic administrative chores, ensuring that students signed on at regular intervals, for instance. Consistent with his classroom practice, though, John was reluctant to draw quiet students into participating in the conference discussions. He explained,

> After a conversation has gone a little while, I tend not to say "Well, what do you think, Jim?" or "What do you think, Mary?" I probably should do more of that but . . . I've got this belief that people participate at a rate that is comfortable for them. (Int. 1, p. 22)

He tried to set up several fairly focused sub-conferences to keep discussions on track. He also asked students to redirect comments to more applicable conferences if they varied significantly from the parameters described at the outset of each conference. Usually, this was not a problem. He noted,

> [If the conversation] started to steer off topic too much I tended to bring it back, but I break the thing down into topics and I allow a section called "Other" where I steer stuff that I don't think belongs. It didn't get overly used. I thought it would get used more, but it didn't get overly used. So I found they stayed with the ideas pretty good. (Int. 2, p. 2)

John found that students were seldom confused by various threads of discussion within a particular conference. Rather, individual students tended to minimize the number of threads by learning to read all the new conference messages before contributing their comments, and focusing these comments on the current discussions.

Most of his postings in the computer conferences were in response to individual comments from students. He found that including written comments about the volume and quality of each student's conference participation on returned assignments was an effective way to unobtrusively and gently inform students of ways to improve their computer conference contributions. He generally acknowledged these contributions, and was encouraging. He was particularly sensitive to students' needs to be positively reinforced after their initial conference contribution. He commented,

> I'm very, very sensitive to hurting their feelings at [the start of the course]. So I tend to be very positive. Even if I think that they need to pick up the quality of their thinking, I'll try to phrase it in a way that says, "I'd like to hear more about . . . ," rather than, "I think you should really think about this before you make that kind of remark." (Int. 1, p. 11)

This approach was somewhat different than comments he made on written assignments, because he considered the assignments to be more formalized means of assessment, with well-specified expectations about structure and content, for instance. He stated,

> I'm not as tactful with their written assignments. I tend to be more – not abrasive at all – but blunt about [saying] "You should have done that," or "You should have done this," or "You don't know APA well enough," or "Start thinking about putting a decent introduction in front of your assignments." You know, mechanical kinds of things. (Int. 1, p. 12)

John found that students usually communicated privately with him by e-mail only about administrative matters, especially in the first few weeks of the course; about unrelated technical advice– for example, advice on computer equipment purchases; and about sensitive, private issues that were affecting their performance in the course. Some students also submitted course-related comments by private e-mail. He would encourage students to post these comments to the applicable conference, which they generally did.

He found that they often seemed to need this initial type of instructor approval and encouragement before contributing to the conferences.

Although he found some techniques to initiate or guide interaction to be similar between computer conferencing and the classroom, John regretted that some of his most useful classroom techniques could not be used in the computer conference environment – especially non-verbal cues like eye contact, physical proximity, conversational tone, type of dress and body language. Therefore, developing interaction among the participants was more difficult. He also found it difficult to write in a "chatty," informal manner in the computer conferences, which he attributed to his formal education and research training. As a result of these factors, he found that authoritative instructor-student relationships were more difficult to dispel in an asynchronous, electronic environment. Students tended to challenge his ideas much more quickly in a classroom.

Despite these concerns, he found certain advantages to computer conferencing. He perceived that the ability of all participants to think before responding allowed them to consider their words more carefully and remain more focused than in the classroom, where the rapidity of dialogue and lack of time for reflective thought often inhibited in-depth discussion of contentious or complex issues.

He considered the permanent nature of the computer conference transcripts to be an important educational aid for students because

> [students are] really building a repertoire of remarks and answers to issues for each other. When they walk away with several hundred pages of transcript, they have in essence the course in their back pocket in terms of how people view these issues. . . . So I think that they go away with a very valuable resource. (Int. 1, p. 7)

Though he believed that group work was an important component of the learning process, John had not found a way to successfully incorporate group-based assignments into his course, in part because of constraints on his available time, and partly out of empathy for some of his students. He remarked,

> I've never tried any group activities in the conference. I'd sure like to, but I haven't quite figured out how I want to do that yet. I've never been a fan of group work myself so I've always been sensitive to people that don't want to do group work. I've always found there's lots there that don't want to do group work – more than we think. And yet I'm a proponent of the fact that you should do group work because it's part of learning, part of the social interaction necessary for learning to happen. (Int. 2, pg. 10)

John assessed students' computer conference contributions primarily on their ability to state and defend their views, rather than on the frequency of their contribution. He found that evaluating student participation was not significantly different from grading term papers. He also assessed students on the basis of his estimate of their personal growth throughout the course, including the evolution of their thinking demonstrated in the computer conference contributions, and their ability to bring in their own experiences and points of view, and defend these.

Overall, John felt that he was generous with the grades he awarded for conference participation and had received no complaints from students about these. However, he found the whole process for assigning grades for graduate-level work "almost abhorrent" because it contradicted his educational philosophy and because he believed that very few students were incapable of graduate-level work in his on-line courses. He felt the marking process was driven primarily by administrative requirements and student expectations, and that it reduced the learning effectiveness of computer conferencing. He explained that

> once I know that [students] can write at a graduate level, they can talk at a graduate level, and they can participate at a graduate level, marks are irrelevant to me. (Int. 1, pg. 11)

Although John received most student assignments electronically, he did not mark them on-line. Rather, he printed off the assignments and made reference to the relevant parts of the assignments in his assessments. He then e-mailed these assessments to his students. He also attached these comments to the printed assignments which were then mailed to the students. Students seemed to prefer this separate, typed comment sheet because they could read his comments more easily.

John found that student reaction to computer conferencing was mixed, though some of his students "thrived" on this type of interaction. He found students in his CMC-based courses to be more highly motivated and with a greater range of life experiences compared to most students in similar classroom-based courses he had instructed elsewhere. They seemed to consider the distance learning experience and the program content to be particularly relevant to their needs, and were prepared to work hard. He noted,

> I think we're getting a fairly motivated, mature learner because they know to some degree what self-study and discipline is necessary to do a course at a distance. . . . I've taught the same course basically at the same level for [another university] three or four times. I would get some people in there that are just taking it because they've got to fill in a summer course to get an extra increment on their salary. I don't get that kind of student very often in this [course]. I get maybe one [per course]. That's less than ten percent of the students, I would say. Most of these students are here exactly because they want this degree and they want to learn something. (Int. 2, p. 16)

He found that his students as a group possessed a wide range of technical expertise. However, they seemed less-informed about the conceptual issues underlying the use of educational technology than he had expected. This was not easily overcome in the on-line environment because technical limitations of the particular electronic learning system used in the M.Ed. program and the inherent nature of distance education restricted student access to libraries and appropriate reference material, in his opinion.

John found that he was able to form mental impressions of his students through the moods and emotions that they communicated by their writing style. This took longer in the electronic environment, though he was learning to do this more quickly with experience. He commented,

> They begin to develop what I call an "electronic personality." That takes longer to develop but they do it through sentence structure. That sounds weird, . . . [but] the way in which they structure sentences and opinions and remarks tends to have a pattern to it. It might be in terms of the length they use or when they make their breaks. When they change patterns, they either have run across something that has really twigged their interest or they're a little [mad] about something. They use emotion in the way in which they structure sentences, let's put it that way. (Int. 1, p. 18)

He observed that his students also exhibited a wide range of interaction styles and preferences, stating,

> You have your different types of students – the ones that want to comment on everything, the ones that want to wait until twenty or thirty remarks have gone by and then they'll come up with a page and a half of dissection. They're similar in that sense to regular seminars. You have the quiet, sort of intelligent person in the back of the room. You're wondering when they're going to say something, but when they do, they're really going to let the world know that there's something between their ears. You have that group. You have the group that just say anything and everything, they don't think too much about what they're saying. They just tend to have that type of personality. You get a broad range. (Int. 1, p. 8)

John stressed the need for instructors to adopt a wider variety of media in the electronic learning environment. For instance, he desired to use audio-visual clips to "break the ice" in the conferences and engage learners more effectively. Students had also often indicated a desire to see digitized pictures of John and other students. He looked forward to the time when these types of media could be easily incorporated into his graduate program's electronic environment to improve its social aspects somewhat and to provide different, particularly aural, forms of communication without losing the advantages of asynchronicity.

He remarked,

> [W]e overuse certain technologies so badly that sometimes people just get terribly tired of the use of the technology and just like to

> listen to a human voice. I began to think that sometimes the technology is an invasion. (Int. 1, p. 7)

Though his area of expertise is in educational technology, John found that time constraints, an out-dated CMC system, and lack of "breakthrough" applications were significant impediments to incorporating some of these newer media forms and improving the CMC experience. However, if he found applications which would significantly improve the on-line learning experiences of his students in the future, he would attempt to incorporate them because he enjoyed working with new technology. He explained,

> No one ever said teaching was easy. Maybe that's our problem with the whole instructional field, that we tend to make it a bit mechanical and haven't given it enough thought as to what teaching really is. . . . Your really good teachers don't do it for the money because you can't really teach well and get paid properly for the effort you put in. I think we're always going to be in that conundrum. If I get a neat technology that I think can enhance the quality of interaction with students, I'm probably going to roll with it even if it takes more time just because I get so much satisfaction from it. (Int. 2, p. 8)

Randy

Randy had limited experience with distance education prior to coming to Access University several years ago. Since then, he has worked in various capacities at the University. Randy had taught two courses in the M.Ed. program prior to our interviews – one in the fall of 1995, and the other in the winter of 1996. The first course had 27 students in it. There were six students in the second course.

The course he taught in the fall is a required course in the M.Ed. program. Students are provided with readings which form the basis of four computer conference topics and tie into the main themes of the course. There are two written assignments. A total of 15% of the course grade is awarded for computer conference participation.

The other course Randy taught was an elective. Students work through various distance education issues by participating in four computer conferences directly related to the major assignments. In the first computer conference, students discuss issues arising from a group of common articles and their own experiences. There are no marks awarded for this. Two students chose not to participate when Randy taught the course.

For the first assignment, each student reads and critiques a unique set of readings. These readings and the related critiques are sent to Randy, who in turn forwards one set to another student in the class for review and feedback. This input is posted to a computer conference for the rest of the class to read. Other students can also contribute to the discussion if they desire. The assignment is worth 30% of the final course grade, including 5% for computer conference participation. The second assignment requires students to respond individually to a case study given to the whole class. During the third conference, they discuss their own ideas about an idealized distance education system in a computer conference with other students and try to arrive at consensus. The students then individually prepare and submit papers describing their systems. This assignment is worth 20% of the final course grade, including 10% for computer conference participation. The third and final assignment is based on a different case study. This assignment is worth 50% of the total course grade. The fourth computer conference is for students to discuss interesting ideas or issues that arise from the final assignments with other students. There are no marks awarded for this activity. Four out of six students did not participate in this conference.

Randy found that student participation was generally greater in his elective course because two of the assignments required students to interact in order to complete them. In his experience, course design had a large impact on the extent of computer conference activity that takes place in a particular course.

He saw two main educational purposes for computer conferencing. First, it gave students the opportunity to discuss distance education issues on a professional basis with their peers. Second, it provided significant, unanticipated learning opportunities for students. For instance, Randy observed that students would often learn about other educational programs (particularly distance education initiatives) under development at other institutions by relating their individual experiences in the conferences. The conferences appeared to be a valuable way for widely-dispersed students to develop professional networks and spread information which, although not directly related to the course, was nonetheless valuable to them. He viewed computer conference interaction as a desirable, but not essential means to learn course content. The assignments were the most important means of synthesizing the content of the print-based instructional material, in his opinion.

Randy did not require group or collaborative learning tasks in his computer conferences for several reasons. He felt he needed more experience as an on-line instructor to successfully adapt the current course assignments to group-based activities. More importantly, though, he was reluctant to force students to undertake group work if it meant that they would be unable to work on more meaningful individualized assignment topics. He stated,

> If I ever really had students come forward and say, "We would like to work on this together," I probably would have said "Yes." But I wouldn't have gone out and said "I want you to do group work." So I would have accommodated a group request but I didn't demand a group response. (Int. 2, p. 19)

One of the primary advantages of technology like computer conferencing to Randy was the perceived benefits to students of asynchronous communication. He explained,

> [I]f you look at the times [students] are making their input, they vary highly from one individual to another. There are some students that get up at 3 or 4 in the morning and do their work

> before they go to work. There are other students that do it on their lunch break at work. There are other students that do it after their kids go to bed, and some in the wee hours of the morning. If you [used synchronous communication], it would be much more difficult to plan these kind of things within one's busy life. I know from the course I taught last semester, a lot of my students work at community colleges and institutions of higher learning. With the cutbacks in education they have had to take on more workload. Fitting [scheduled courses] into an already-busy family and work life would be next to impossible. (Int. 1, p. 4)

Still, the M.Ed. program placed some indirect restrictions on students in order to facilitate interaction. Randy noted that the program's designers had to make some choices between increased interaction and maintenance of student independence and accessibility which characterized homestudy courses offered in the undergraduate programs. Unlike Access University's usual policy of allowing students to enroll in homestudy courses at the start of every month, for instance, the M.Ed. program required students to start at only three points during the year in order to create sufficient numbers of students to facilitate interaction. He noted,

> We decided not to offer [the graduate program] in a self-paced mode because we wanted to have structured dialogues or opportunity for interaction on certain topics. It's easier to do [this] if you have a set of students who start on one day and end on another day. The mechanics of it, the administration of it, the management of it, it makes things much simpler. So we made some programmatic decisions and we predetermined the pace. (Int. 2, p. 13)

Student computer hardware and software requirements also acted to constrain access at the same time that this technology enabled interaction among dispersed learners. He commented,

> Students would be told upfront, prior to being admitted that, "Here are the technological requirements and if you don't have them you must go out and buy them." We put up barriers. Technology is a barrier. (Int. 1, p. 2)

However, he considered asynchronous communication like CMC to be superior to synchronous forms of electronic media in most cases because it allowed learners to have some time- and place-independence while still providing interaction. He felt that the benefits of this technology to students were often overlooked by educators who had limited distance education experience and who preferred synchronous electronic communication technology like desktop videoconferencing. He stated,

> I'm yet to be convinced that anyone needs to go out and buy a $100-200 cueball camera and that it really facilitates anything. I would like to see some research. If the research says it makes a difference in terms of student motivation and student learning, etc., then its a relatively cheap solution to getting over some of those barriers. I'm not personally convinced that it's required. What does looking at somebody's face do? I think a lot of people adopt [synchronous electronic communication] because they haven't [done] distance education . . . and they're more familiar with classroom instruction. The more like classroom instruction it is, the more comfortable they feel. (Int. 1, p. 3)

Randy "lurked" in three M.Ed. computer conferences prior to instructing his own courses. He found that this enabled him to evaluate strengths and weaknesses of various moderating practices, and inform his own technique.

Some of his other on-line practices resulted from his beliefs about the appropriate role of the instructor. For instance, he consciously delayed contributing to the conference discussions to encourage students to learn from each other. He remarked,

> There shouldn't have to be an instructor for people to learn if you can learn from one another. If you are building a cabinet and have never built cabinets, but your neighbor next door is a carpenter, do you have to go on a workshop to learn, or can you learn from other people in your environment? I mean, that's kind of stretching it a bit, but I just don't think an instructor should be answering all the questions. (Int. 1, p. 10)

When Randy delayed his responses, he found that students usually made the same kind of points that he would have raised anyway. He explained,

> I probably would wait for at least a day, maybe two [before responding], because I believe that there is somebody out there in the class that knows that answer and it would be better for them to explain it than me. I guess it's a philosophy in terms of peer learning. . . . And I tell them that, too. I say, "You can direct questions to me, but I may not jump in right away because I want

> to give other students an opportunity to show what they know, and to have their input." (Int. 1, p. 9)

However, he did provide direction in less-obvious ways. For instance, students were given a limited period of time to contribute to each conference. Although a conference was not closed at a particular date, students were encouraged by Randy to proceed to the next one when he indicated that he considered the conference to be over and specifically asked students to move on.

He also tracked conference contributions, and prompted the group if they had not responded to issues raised in a particular message within what he considered to be a reasonable period of time. He intervened in the on-line discussions only when he felt he had to probe the class to consider specific issues that had been missed up to that point in time or that might be applicable to the related assignment. However, he would intervene immediately if a student raised an issue that required instructor guidance – for instance, if the course materials were unclear. He provided more specific directions to various sub-groups within the conferences of his elective course when this appeared necessary to help them identify issues that had been ignored or spur them to consensus (or to various separate conclusions) as assignment deadlines approached. Even then, though, he tried to structure his comments to evoke student thought, not provide them with answers. He noted,

> I plant little seeds to try to get them to think, "What is he driving at?" as opposed to saying, "I have reviewed your conference and I would say that you missed the following areas: Blah, blah, blah," and just lay it out for them. I wanted them to discover what the answers were. I never said there was a right answer. (Int. 1, p. 14)

Randy found that delaying feedback also allowed students to sort out conflicts that arose in the group. He recalled one incident when a student personally attacked another student on-line. The incident

> kind of freaked me out and I didn't know what to do with it. So I thought "I'm not going to do anything for at least a few days and

> let's see if there are any students that do anything." Actually there were a couple of students that came along and said exactly what I would have said which is "I think you missed the point and that's not how I read what she was saying." (Int. 2, p. 25)

He observed that students eventually ignored comments from students who were considered to be overbearing or obnoxious. However, he found that student-student conflict occurred infrequently. Students overwhelmingly respected differences of opinion, and dealt courteously with those whose opinions they did not share.

Student-instructor conflict was more common, in his opinion. While lurking in other courses, he observed that students disagreed heatedly with philosophical positions of professors at times. By and large, though, most of these disagreements related to more pragmatic concerns. He commented,

> Typically, [observed conflict between student and professor] is more of a result of [students] being angry about something else. You know, like "I thought the feedback you gave on the assignment stunk. I spent hours doing this assignment and I get back a paragraph saying it was good and congratulations. Seven hundred dollars is a lot of money to pay for a course. I expect a little bit more than this." (Int. 2, p. 27)

Randy observed that students were also more apt to criticize those in their immediate work situations than other students or the course professor. As a result, they were concerned about how their comments would be used outside the conference context and about the ethics of discussing individual, work-related situations. He stated,

> I've seen more concern from the student's end like "What happens to our comments when this course is over? Who has access to these? Are they archived? Are they confidential?" They are making statements about their institution and the cutbacks and some stupid things that went on in their institution. They don't want [that] to get back to their boss or their institution. It could jeopardize their job. So you see some of that – some of the moral questions, ethical questions, concerning it. (Int. 1, p. 14)

Randy did not summarize and weave various discussion threads very often because he felt that these threads often formed the bases for students' analyses in their individual or group assignments. Students in effect were encouraged by the course structure to perform these integrative functions themselves.

Because of his philosophical agreement with the principles of personalized systems of instruction, Randy found that this perception of his instructional role did not change much when he became a computer conference instructor. In any teaching situation, he did not consider himself to be an authority figure. He remarked,

> I think that [individual perception of self as educational leader] has a lot more to do with the instructor's individual personality. I personally have never felt threatened by students. [I] don't think that I'm better than them, I always consider myself their equal. So to participate in [computer conferencing activity] that could potentially or does democratize education or empower the student more – all I can say is that those are the kind of strategies I have always been in favour of in the first place. Individualized instruction is not exactly a situation where the instructor is empowered. The instructor is giving the power to the student. So it's a philosophical change that would be required of many, but wasn't of me. (Int. 1, p. 6)

Because he considered it important to accommodate individual learning preferences as much as possible, Randy responded in kind to students who preferred to send him comments or questions via e-mail, rather than posting to the conferences. If his private responses might be of general interest to the class, but not directly related to the conference topics, he preferred to send e-mail to all the students by using a group alias, rather than posting the message to a computer conference. As a result of these factors, most of Randy's electronic interaction with students was by one-to-one or one-to-many electronic mail.

Randy stated that the level of interaction in his first two courses that he instructed "far exceeded" that which had occurred in any of his university student experiences, including graduate studies. Student comments were perceived by him to be more frequent and less restrained in the electronic environment because students knew that their comments were going to be considered by others without being as markedly influenced by factors like gender, physical appearance, or ability to speak. Students were also able to reflect and research issues prior to contributing to the conferences, so they had more confidence that their contributions would be meaningful. As a result, he found that students' comments were generally thoughtful and well-presented. Some students would even make significant, lengthy, and unsolicited contributions at times. CMC technology did not appear to constrain the depth or amount of student responses, in his opinion.

Randy found that contrived computer conference contributions (those designed to satisfy participation requirements, but without substance) occurred infrequently in his experience, and that instances of this could be limited by the instructor interjecting, noting that the topic seemed to have been covered fairly completely, and redirecting students to other related issues or to a new topic. Even if the quality of comments was less than optimum at times, he felt that the interaction that was occurring was valuable in most instances.

He preferred to make computer conference participation completely voluntary, but attached some amount of the overall course grade to conference participation to encourage interaction. Otherwise, he felt that some students would not participate. Generally he relied on the course structure, particularly the assignments, to provide appropriate incentives for computer conference interaction.

Randy found the assignment marking and feedback process to be more time-consuming than he anticipated because he provided electronic rather than hand-written comments on the assignments. He experimented with several methods of marking the assignments (virtually all submitted electronically), but had not found an efficient way to do this. He explained,

> I print the assignment out and then mark my comments on the student's assignment. Then I go on to e-mail and compose all my written feedback electronically. If I don't do it at that stage – print,

> write on it, type the file and send it to the student – oftentimes by the time I get through marking several assignments I go back to the earlier assignments that I've marked and I can't remember why I wrote what I wrote. Then I end up remarking some. So I found marking to be a tremendous burden on me. Part of that has to do with my experience of marking right on the student's paper, and part of it is if you do it that way and then convert it electronically to get it to the student – you're not being very efficient. (Int. 1, p. 20)

Although he felt that electronic comments improved the quality of service to his students because it was faster than using the postal system, Randy found that other unavoidable factors delayed feedback to students. For instance, some of his assignments were individualized and extensive. As a result, he found that it often took 6-12 hours to mark one assignment thoroughly. Because he carried out his program administration duties concurrently, he could not mark for concentrated periods of time. This factor also affected his turnaround time. As a result, he often grew frustrated with the marking process. He noted,

> [I]t really bothers me as an instructor and believing in the importance of immediacy of feedback, to be giving students feedback two weeks after the fact when I know the technology is there to give them 24-hour turnaround. But I mean I couldn't do it in 24 hours. We have kind of a standard - a week. You should be able to mark, grade, and get feedback to your student in a week. And I haven't been able to meet that standard. But it's because of the way I organize the rest of my work and responsibilities. (Int. 1, p. 22)

In summing up what he had learned about his computer conference experiences, Randy stated that his views about its purposes and functions were still evolving. He commented,

> I think what I learned was that we don't know all that much about how to use the technology, and maybe what we're doing is not that great. Maybe we should be doing different things. [For instance], should we be using this technology only for group kinds of things, or is there value in having the one-off kinds of discussions, or letting the students use this as a way to self-discover the obvious that I could have told them right up front? Is that important? I don't know the answers to these things, they're just hunches and everyone seems to do it different ways. (Int. 1, p. 18)

Mike

As a researcher, Mike is primarily interested in mature learners. He had limited exposure to distance education prior to coming to Access University, and to computer conferencing at the University prior to his experience in the M.Ed. program. He had taught one graduate-level computer conference course a total of two times prior to our interviews. There were 12 and 18 students in these offerings respectively.

Mike's course is an elective dealing with various issues and perspectives in adult, primarily higher, education. The first unit of the course is "fairly structured." Gradually, less structure is imposed on the material, and students are encouraged to more self-directed in their learning.

There are seven instructor-led conferences in the course. Participation by students in these conferences makes up a total of 10% of the course grade. Topics are specified by Mike in advance, and tie into the main themes of the course. In addition, each student is required to present a topic in a separate computer conference with four or five other student participants on some aspect of adult education with which the student has experience, and to facilitate the ensuing group discussion. Twenty-five percent of the course grade is awarded for this activity. The remainder of the course grade relates to individually-submitted written assignments.

Mike wanted to expose students in the M.Ed. program to alternate perspectives of adult education. Since it was CMC-based, he became a computer conference instructor rather by default. He explained,

> I was involved with the M.Ed. program from quite early days, sitting on the [Program] Council, and it was clear that many of the courses were going forward in what you might call a technical/rational paradigm. They [concentrated on] a high level of skill development. I wanted to ensure that there was some critical/analytical courses in there as well to give the opportunity for those students who were interested in thinking about adult

> education to do it in a more rounded and critical fashion than might have been possible. (Int. 2, p. 3)

He did not consider his course's educational goals to be that of mastering pre-specified, carefully constructed learning objectives. Rather, he stated,

> I'm trying to get people to think critically, to critically evaluate the material they read, to think broadly about the issues, the kind of things that behaviourist psychologists are not happy with, because I don't define them as very specific objectives, and I don't have mastery learning objectives. Now, I think if you had a course that was teaching more technical material and using mastery learning objectives, you could be clearer about what it is you want at each stage. But for me when somebody says to me, "I never thought about this," or "I never realized that," then that's a success for me. For the first time they're reading about something they don't know. (Int. 1, p. 12)

Mike did not think that his teaching goals differed fundamentally between the classroom and electronic environments. His primary role in either medium was getting students to think about some of the assumptions and principles underlying adult education theory and practice. He emphasized what he termed the "social" aspect of adult education – education which enabled adult learners in politically under-represented and disadvantaged groups to become more aware of how education can be structured to serve larger political ends. He encouraged his students to use this awareness as a means to participate more fully in their local social and political arenas. In his opinion, this was an area largely ignored by mainstream adult educators. He noted,

> What I'm trying to get them to see is the way adult education can be used for individual purposes. It could be just used for personal gain, personal benefit, serving the needs of the economy. But in saying that, people have to see how that, in fact, also serves a broader agenda, a kind of broader economy in which people don't have democratic rights and participation and a say in the way in which their economic and social lives are organized. So I get them to question that simple belief that education can just be for individual purposes. I try to get them to look at the way education can be used in a broader context, beyond individual training, for achieving broader democratic participation. . . . Education for democracy – it seems to me that that's one of the primary purposes of education, to enhance participation in democratic processes

> within society. I don't have a problem with saying that's the purpose of education generally. (Int. 1, pg. 17)

He made a conscious effort to present this point of view in the computer conference discussions, and was unapologetic about this. He commented,

> I couldn't be the kind of facilitator who would sit back around the table and say, "What's everybody's view of adult education?" and then in the end not summarize that and give a perspective on it. I see adult education as having a social purpose, and I see it as distinctive from a broader "education for adults," so in relation to the course I was teaching, I have a view about it. I do want them to understand that view. I don't mind them criticizing that, but I do want them to understand it. (Int. 1, p. 1)

Mike designed his course to combine peer and experiential learning with print-based learning material. He found that the University's print production processes required instructors to carefully plan this part of their courses. As a result, these distance education courses tended to provide more comprehensive coverage of the instructional material compared to those conducted in a classroom environment, in his opinion.

He considered the print-based readings to be an important means of instruction, but also placed a great deal of emphasis on group interaction. As a result, Mike considered computer conferencing to be an indispensable part of the course. He stated,

> I did see conferencing as definitely the course. That's where the interaction took place, that's where the discussions were, that's where the topics were batted about. . . . This was an electronic classroom. And that made it distinctive from the kind of individualized learning that we do in our undergraduate courses at [Access University]. (Int 1, p. 15)

Though he felt that computer conferencing improved the distance learning experience, Mike was of the opinion that computer conferencing did not provide the same rich learning experiences as face-to-face interaction because of the asynchronous nature of the medium. As a result, he sometimes thought that computer conferencing might be less able or even unable to provide the appropriate learning environment for meaningful social adult education to occur. In particular, he found it difficult to initiate or maintain the dialogue with students needed to challenge underlying "dominant hegemonic political/social/economic viewpoints." He gave several reasons for this.

First, he found that there was too little argument and debate among the students in the computer conferences for his liking. He attributed this partly to the lack of non-verbal cues of acceptance and tolerance that could be communicated in a classroom to create a less-threatening environment, which in turn allowed for a more frank and open exchange of diverse points of view.

He also found that the textual nature of CMC could distort intent, or fail to convey suitable context for comments. He recounted a recent e-mail experience with a colleague which illustrated this problem.

> I recently e-mailed [instructor X] about a course that he's putting together. And really I would have liked to have talked to him about it. My e-mail looked very pithy, very critical. I am critical of the course, but I would like to say, "Hey, [instructor X], how about this? How about that? What is this course about?" I could have had a much better dialogue with him. He could have then told me about the origin of the course. Even a fifteen minute discussion would have been preferable to having to use this technology. But I had to get this response in, and [he] wasn't around, so I put it on e-mail. After I put it on, I thought maybe I shouldn't have done that (laughter). . . . [I]t said a lot less than I would have said had I talked to him verbally. I only made it a short paragraph. (Int. 1, p. 3)

He contended that students also seemed less willing to challenge him in the computer conferences compared to the classroom because their preconceived notions of the instructor as an authority figure or content expert seemed more difficult to dispel in computer conferences. In his experience, this occurred even though his M.Ed. students often demonstrated a great deal of knowledge and experience in a particular area and could do research off-line before contributing to the session.

In addition, Mike found that student comments in computer conferences were less thoughtful overall than those expressed in the classroom. Although he noted that a few students had made exceptional, unsolicited contributions, many students tended to quickly read and reply to conference discussions on-line, or seemed averse to textual input. Students often did not appear willing to read more than brief comments on-screen, and their replies tended to be fairly short – three or four lines generally, and hardly ever longer than one computer screen. Though he acknowledged that students had a greater opportunity to reflect before responding in the electronic environment, he questioned whether most students actually took advantage of this.

He observed that it was more difficult to force students to think through and discuss more difficult or complex issues in a computer conferencing environment because it was hard to direct a conversation on-line, and immediate instructor feedback was not available to steer student comments into more relevant and contentious areas when they strayed from the thrust of the debate. As a result, he still questioned whether only the more superficial or easier aspects of an issue were often discussed in the computer conferences. He remarked,

> In a classroom you can ask a question and get a response, ask a question, get a response, ask a question, get a response. You can develop a dialogue between two students or between the student and the tutor or between yourself and the class generally. You can develop a dialogue quite quickly whereas on-line it takes more time and other issues can interject and you can lose the thread of what you're discussing. I think, although it's easier to ask a question on-line because you don't have to "catch the tutor's eye" or you don't have to have thought of the question the moment it came up, pursuing an issue is more problematic. I'm still thinking about this. I haven't come to a firm conclusion but I'm still thinking about that. (Int. 2, p. 8)

The problem was alleviated somewhat in later offerings of his course, he felt, by specifically raising contentious issues in the course material or as part of assigned work. Still, this tendency for students to dodge more difficult aspects of an issue continued to be problematic, in his opinion.

Mike also felt he could "stare down" issues – that is, deal with misunderstandings, elaborate on issues, or clarify concepts – more easily in a traditional classroom setting. He explained,

> If an issue comes up that you feel needs to be addressed directly before moving on to anything else, in a class you can stop and stare down that issue until you've got it, until the class understands it, until you're happy that people have at least wrestled with the issue before moving on. (Int. 1, p. 8)

This was not possible to the same extent in the computer conferencing environment, in his experience. Understanding did not occur at the same time within the group. The argument structures of individual issues were often difficult to follow in the computer conferences because messages were read and responded to at different times by students. Other tangential postings often intervened before the misunderstandings or issues were addressed, which tended to cloud the discussion. Further, if he did address the issue he was unsure whether students understood his point, or if they simply lost interest and moved on to other matters. Unlike a classroom, he had no visual cues to indicate that the members of the class had understood the issues sufficiently.

Besides instructional problems with the medium, Mike raised fundamental questions about educating any group of geographically-dispersed adults through electronic, asynchronous means of communication. Although interaction provided some benefits for previously-isolated students, he preferred localized educational settings because these provided common points of reference for subsequent community-based socio-political action by students.

If teaching effectiveness was defined in terms of facilitating social adult education, Mike believed that computer-mediated communication might not just require instructors to teach differently to be effective. Rather, the ability to teach effectively might be unavoidably impaired.

He noted,

> It may be that the nature of this communication is such that you're always going to have problems in this area. And that's a question I'm beginning to wrestle with. (Int. 1, p. 9)

As a result, he saw computer conferences as ideally providing additional forums for thoughtful, reflective comments and interaction among learners in primarily classroom-based learning situations. He expressed doubts about whether CMC alone was an improvement over the classroom learning experience.

Mike found that his on-line functions gradually changed as each course progressed. Initially, he tended to guide students through the learning material and summarize contributions. He then began to withdraw from active participation, and allowed the students to contribute relatively more comments to the discussions, though he monitored the conferences to make sure that the comments were relevant and that the discussion was evolving. However, he did not intervene much in the conferences or try to influence their direction, other than to keep the discussion focused on a single topic as much as possible.

When responding to students' postings, he would try not to be particularly critical and would comment on one or two points raised. He had learned to wait for other students to make comments and not to immediately jump into a discussion. He found this easier to do in the electronic environment, remarking that

> . . . in a classroom, I have to consciously shut myself up and let them speak, to give them space. It's easier to do that electronically, because you've got to force yourself to type in the comments. It's easier to just say, "I'll wait to see what else comes in." (Int. 1, p. 14)

Partly as a result of this, he found that levels of student interaction were greater in the second offering of his course, although the larger class size aided interaction. He also found that he needed to sign on regularly, generally daily, and for about one-half hour to three hours each session. This helped him to encourage student interaction, keep abreast of conference discussions, deal with issues as they arose, and provide prompt responses to student queries.

Mike preferred to grade students on a pass or fail basis. However, he was constrained by program requirements to award specific grades, so he based part of this assessment on conference participation. He found assigning marks for graduate-level work difficult, especially for computer conference participation. Students did not appear to be particularly motivated to participate just because some part of the course grade was awarded for this activity. To him, the primary impetus for conference participation seemed to be the intrinsic desire of students to communicate with each other about the issues under discussion in the course. Awarding marks for this was somewhat regressive, in his opinion.

He initially attempted to assess student participation in the computer conferences on the basis of message content. However, he abandoned this criterion and began to assess students on the regularity of their contributions. He felt that some students experienced communication problems and tended to reduce the length of their comments for fear of being disconnected. Some of the inherent characteristics of computer conferencing – asynchronicity and the textual nature of the medium, primarily – also constrained meaningful student interaction and reduced the quality of contributions, he found. It was more appropriate to assess students on their performances as main presenters in and moderators of their own conferences, which they were required to do as part of the overall course requirements. Still, he found it "very, very tricky" to assess these computer conference presentations and the quality of student moderators' responses to questions posed by other students.

Mike expressed some uncertainty about the practice of requiring students to moderate their own conferences and participate in the others as well, especially when greater numbers of students were enrolled in his course.

He remarked,

> Some students complained that there were too many conferences, because those [student moderated] conferences on top of the conferences I set up resulted in a large number. In fact, I'm a little concerned that I've got a course this time of 18 students. Now if 18 students all [moderate their own conferences], and I want to maintain this structure where they all have to make a presentation, and then they're going to respond to the conferences I'm going to establish as well, they're going to be very busy during this course. (Int. 1, p. 4)

When he marked assignments, Mike preferred to print out any that were submitted electronically, make his comments on the paper-based copies, and mail the annotated assignments back to his students. He also sent a brief e-mail message to each student with a summary of the applicable feedback. He found this system more time-consuming than marking in either a classroom or a traditional homestudy course.

Mike was also not satisfied with the various pieces of communication software used in the M.Ed. program, particularly because of the lack of a common graphical user interface among the various e-mail, computer conference, and file transfer applications, and other technical problems. He stated,

> This mixing of systems is clumsy. And I think it's typified in a way by the manual the students got for my course [which] included a very thick series of guides to use the computer equipment and systems at Access [University]. In fact, that was thicker than my course [material]. Students who were fairly sophisticated probably handled all that quite well. But a number of students had problems with [the CMC system] – entering documents they had previously prepared, getting kicked out. Others preferred to try to enter [extensive comments] on-line. That was an expensive process if they were some distance away [and connected by modem]. So I don't think this is a very good system. I really think we should move away from it. (Int. 1, p. 2)

He also had mixed feelings about the use of new electronic technology in education because of the technical challenges that sometimes arose. He commented,

> Our assumption is that this technology is great. It's a great progressive move forward. But the technology itself sometimes creates problems. I had a situation where during the period of heavy rain my phone line was down so I couldn't find out what

> was going on in the course for a couple of days. You're exposed to that kind of problem and likewise, students have specific problems with their system not working very well. (Int. 2, p. 1)

On the other hand, these interruptions to access were not generally critical. Unlike classroom-based course, he found that the on-line class carried on without him even when he could not "attend."

Mike felt that he could improve several areas of his CMC instructional technique. For instance, he did not draw out participants as much as he thought he should, and felt he was not good at spotting non-participants. He planned to track student responses more closely in the future and encourage more students to contribute to the conferences. Students had at times stated that they did not think they received enough feedback from him until well into the course. As a result, he was considering developing a short written assignment that would be submitted soon after the course commenced.

In addition, and although he valued group learning experiences, he had not as yet been able to create effective collaborative learning activities for his on-line students. In his classroom teaching experiences, he usually built in significant amounts of group work and smaller group discussions.

He also tended to comment on individual student contributions, and did not generally summarize the conference discussions after the initial stage of his courses. At times, he thought he needed to do more summarizing and weaving of the conference discussions. On the other hand, he felt that he connected many of the issues under discussion in the conferences beforehand when he prepared the course materials, and that the materials often provided sufficient overall structure and context for students' comments without needing to draw the various threads together at the close of discussions.

Finally, Mike limited his use of private e-mail communication to discussions with individual students about the topics they would present in their student-led conferences.

However, he felt he needed to make better use of e-mail to privately contact students and encourage them to contribute to the public discussion, or to provide more feedback to them about their conference presentations, for instance.

These types of changes were difficult to make because some lessons that he learned were forgotten and because he was not particularly interested in computers *per se*. He explained,

> I still have a long way to go in developing my own skills. The problem is that there are big gaps [of time between CMC courses that he instructs]. The sort of stuff I have learned I tend to forget again before I do it again the next time. That's because I'm not the sort of person who is computer-focused. Developing expertise on the computer is something I do on the basis of "Well, I have to do it." I try and do it, but it's not something I do because I enjoy using the computer particularly. (Int. 2, p. 14)

Still, there were some features of his courses he was satisfied with. He commented,

> I'm still quite pleased with the fact that I have a fairly extensive written core that goes out to people and provides the basis from which they do their conferencing. So I think I'm definitely going to stick with that. I'm going to try and see whether I can do more. This question of group activity interests me. I haven't worked out how to do it yet, but I'm going to see whether I can do that in the future. I'm fairly happy with what I've done. I've learned a few things from last time which I applied this time. . . . I'm relatively happy with what's gone on. I think the structure seems to work. (Int. 2, p. 14)

Mike felt that computer conferencing was still preferable to Access University's traditional homestudy model because it at least provided a means for learners separated from each other by time and distance to interact with peers and the instructor, and dynamically experience and discuss alternative points of view. In contrast, he saw print-based homestudy courses as a somewhat inadequate form of education for adult learners because these courses generally provided little interaction other than occasional telephone contact with tutors and support staff, were highly structured, and often concentrated on skill development rather than critical analysis. He noted,

> That's what I was trying to say at the outset, that the criticisms I have don't negate the technology. I think we should still persist with this kind of conferencing. (Int. 1, p. 20)

Doreen

Doreen has instructed two on-line graduate courses in the M.Ed. program. One course is required. She has offered this course twice (once team taught). Each course had about 30 students and four scheduled conferences. Doreen provided students with a set of readings, a study guide with course assignment information, commentary on some of the readings, and questions designed to encourage initial interaction in the computer conferences, all in print form.

The other course is an elective. Doreen had instructed this optional course once prior to our interviews. The class size was about 15. The course also uses print-based material, and requires students to discuss a major case study assignment as a group prior to submitting individual assignments for grading.

Doreen's students came from a wide range of backgrounds including college teachers and administrators, the oil industry, and the civil service. As a result, they brought a broad cross-section of views to the computer conference discussions. She found her students to be exceptional on the whole. Regarding her first cohort, she stated,

> Their motivation was extraordinary. The range of experience and their competence was also extraordinary. I think 15 people generated about 70 comments, all perfectly reasonable. They were extraordinarily quick and good with dealing with each other. There was no flaming, there was no nasty comment. (Int. 1, p. 7)

Doreen considered herself a novice at computer conferencing, and was generally skeptical about the ability of educators to understand the appropriate uses of computer conferencing, like other electronic learning technologies.

She remarked,

> I know what this technology looks like. I've read the books, I've seen the literature. I have used other technologies like teleconferencing and so on. One of the things I know is that it doesn't work like you think it will. (Int. 1, p. 4)

Doreen viewed the written assignments in her course as one of the most important means to trigger learning. This was enhanced by bringing students' life experiences to bear on the content of the learning materials.

In her opinion, computer conferencing was only one of several possible options to facilitate the learning process at a distance. She felt that computer conferencing was not always essential for distance learners because the means to foster learning in the student depended on the nature of the desired learning outcomes. She explained,

> [Computer conferencing] is a tool, it's a communication tool [like other media]. Their characteristics, like hammers and screwdrivers, are different. You know, they work a little differently. . . . If I came along to you and said, "Do you need a hammer," you'd say, "Doesn't it depend on what I'm trying to do?" Yes, it depends on what you're trying to do. (Int. 1, p. 26)

She felt it was "unconscionable" to force adult learners to learn anything in a particular manner or at a particular time because they had their own views, constraints, and personally-limiting circumstances. She thus believed that computer conferencing could enhance student learning experiences only if they were allowed to use the medium voluntarily. She noted,

> Basically in my black little heart I think this: I think that for some people, [computer conferencing is] never essential. And for some people, it's always essential. The best I can do as a teacher is to try to arrange circumstances so both kinds of people get as much as possible of what they need. (Int. 1, p. 12)

As a result, she had insisted from the outset of the M.Ed. program development process that computer conferencing should not be considered a necessary and central part of the program, but rather one means of communication to be used as each instructor saw fit.

She commented,

> We [the graduate program designers] made a concrete and conscious decision that each of us would use these components of the CMC system [e-mail, file transfer, computer conferencing] in our own way. There was no coercion on us beyond, "Try all the pieces." E-mail, how can you avoid it, given that our students are literally coast to coast to coast? But we weren't required to use conferencing in any particular way, or volume or weight. (Int. 1, p. 5)

Having decided to incorporate computer conferencing into her courses, she carefully specified the structure of the conferences and desired levels of student participation beforehand. She assigned a minimal grade to conferencing activity in each course (10%) so as not to make students feel that they were being forced to participate, yet to reward student initiative somewhat. If students chose to contribute significantly more to the conference, she did not feel it was necessary to raise the overall grade weight for participation. She assumed that individual students found some intrinsic value in interacting; hence, their increased levels of participation were their own reward.

She assigned either zero or full marks for conference participation. She also made allowances for students who had trouble establishing or maintaining on-line connections. Despite her private encouragement and what she felt to be a very generous assessment practice, she found that some students still preferred not to contribute to the conferences at all. This prompted her to add a group-based activity to each of her courses in an attempt to add perceived value to the computer conferencing activities.

This added complexity to the courses, though. In one case, Doreen sent out several sets of readings on floppy disks to smaller groups of students. However, she had not anticipated how long it would take the students to receive, read and incorporate the readings into their discussions, so little interaction resulted. She also attempted to exchange papers and other written student work among the class using an on-line public domain directory, but found that the CMC system required too many steps for students to accomplish this task easily. She stated,

> [The process] is a nightmare because students have to get their document up and get it placed in the public domain directory and then they have to put in the key words to allow somebody else to take it out. When I tried it, [Computing Technology staff] gave me a list of steps. There were twenty steps and I sent it back and I said "Go beyond six or seven steps and ninety percent of the people will [mess] it up. You can't do that." (Int. 2, p. 18)

As a result, these attempts at group activity were generally unsuccessful. However, she did not feel this was necessarily problematic. As she remarked,

> I'm not convinced yet – I mean there's something I've got to do to make it a better assignment, think up better ways to improve it – but . . . I can always think of an individual way to do [a group assignment]. For instance, one of my students thought he was going to be in Nigeria. So I thought, "Fine, you can do this. You have to do it by yourself." (Int. 1, p. 12)

Doreen's concept of appropriate instructor interaction with students changed as a result of her experiences in the first offering of her required course. She felt that her initial contributions were too frequent, or tended to unduly influence the direction of the conversations. She was concerned that she might be discouraging student participation because her comments could be perceived as authoritative, instead of enabling. She also found that initial time demands placed on her as an instructor were overwhelming. She explained that during the first year,

> I was putting in an hour and a half to three hours per day, six days a week. The first month, it was seven days a week, and then I said, "Don't do this, you're going to get really burned out." I was putting in horrendous hours. (Int. 1, p. 20)

Some of her students were also overwhelmed in her first course because of the number of conference messages that fellow-students generated. She had designed a number of questions to start the conference discussions, because her reading of the literature indicated that initiating interaction was often difficult. However, a number of students mistakenly felt that they needed to respond to each question. As a result of this high and unanticipated level of initial student participation, the number of conference messages grew rapidly in the first few days. Students who were not able to join the conference until several days after the course commenced were overwhelmed by the volume of messages when they eventually signed on. Others found it increasingly difficult to keep up. She recounted the experience and the remedial actions she took:

> [My students] were sending me frantic e-mail. They were terrified, some of them. Others were furious. There were different reactions to this. I had not anticipated participation rates at that level. I was absolutely flabbergasted. I was logging on 3 to 5 times a day and seeing this accumulating at a horrific rate, and thinking, "What are they going to do?" So I guess about 7 or 8 days after the beginning of the course, I opened a second conference, and I said, "Look, there's nothing wrong with what you're doing here. These are good, sound, very useful comments, and those of you who are comfortable, carry on. But there's some of you who are being overwhelmed. Furthermore, understand the role and function of this conference. This is to help us to have the opportunity to discuss, to express, to think. It's only worth 10% of your grade. It shouldn't be punishing to you. So here's another conference. Let's just take an hour per topic, and a calmer approach, and those of you who are unnerved by [the first] conference, move here." (Int. 1, p. 7)

After these initial, negative experiences, Doreen took particular steps to change her facilitation practices in the second offering of the course. She reduced the number of "discussion starter" questions. She also narrowed and more clearly defined the conference discussion topics. Doreen found that these measures reduced her workload and the number of conference messages, especially at the start of the course. It also reduced student confusion and anxiety. She noted,

> [Students] didn't need the same level of reassurance [in the second offering of the course]. The first ones, they were struggling with the technology, they were new students, this is a new program. All of these things are going on and they seemed frantic to get their comment in. The second cohort of students seemed less frantic. They were OK, if they didn't get in for a week, it was all right. The first students, if you didn't get in for a week there were a hundred comments. So here's this wad you've go to read and you might get cut off when you're trying to read it. So the second students didn't face that big wad. It started slower, more calmly, more coolly. (Int. 2, p. 13)

By the second offering, she learned that she could generally rely on students to add or state counter-arguments to points of view expressed in the conferences. She tended to wait longer before replying as a result. She made specific efforts at reassuring students at the outset that she would allow them to take longer to read and think about the discussions without prompting them to contribute. She also removed all references to the content of the subsequent conferences and directions about how to join them until she wanted these discussions to commence. She found that she needed to control access to succeeding conferences in order to encourage students to progress through the course together, and facilitate more coherent group discussions.

Experience with the technology also changed her instructional style. By the second offering of the course, Doreen had learned how to make comments off-line and then post them to the applicable conference. This reduced her tendency to reply to individual comments on-line. It also allowed her more time to identify major threads, reflect and synthesize conference comments, yet still feel that she was contributing to the conference discussions. As a result of these changes, she felt that the quality of contributions by both her and her students improved.

Out of respect for their privacy, Doreen was reluctant to draw out students who did not seem to be participating in the computer conferences. She used other forms of computer-mediated communication besides computer conferencing to encourage individual students who might need more assistance and to compensate somewhat for her reduced interaction in the second set of conferences. She sent out a broadcast e-mail message at the start of the second course to all her students, encouraging them to send her private e-mail messages if they desired. Consequently, she increased the amounts of one-to-one communication she had with individual students. She ensured that she logged on several times each day so that she could respond to these private e-mail messages as quickly as possible. She stated, "You don't sit on student messages. It's simply bad form" (Int. 1, p. 20).

She felt that private electronic communication provided better personal and social support for students, which she considered to be one of the most important purposes of a distance education instructor. She also used private e-mail to send additional reading materials to individual students if requested. She was unsure if these changes to her instructional practices were appropriate, although there were no comments to the contrary in her formal student assessments and private e-mail discussions with students.

Doreen's assignment marking procedures had changed over time. She found that her small computer screen initially made on-line marking difficult. During her first course, she printed off the electronically-submitted assignments (though many were submitted by FAX due to problems with the on-line communication system). She made her comments on the hard copy versions of the assignments, and mailed these back to her students. Eventually she used a larger computer screen, but she would still print out the assignments, make notes on these, type the comments into a word processing program, electronically cut and paste relevant parts of the students' assignments into these comments, and e-mail the resulting documents to her students. She found this process more time-consuming personally, but it did eliminate feedback delays caused by the mail system. Generally, she was able to mark and electronically return the assignments to students within one week.

She noted that she was learning to use newer on-line tools for marking, and developing a database of common comments and examples of work by other students which she could insert into her comments. She was also investigating other types of technology which could reduce marking time, like the use of graphic tablets to electronically write on student assignments. These investigative activities were time-consuming, though, and so her efforts at improving the marking process were impeded.

Doreen expressed reservations about the value of a lot of student-student interaction that occurred in computer conferences. To her, these often evidenced "the blind leading the blind" and did not contribute substantially to student learning. Further, though Doreen considered computer conferences to be positive experiences on the whole for students in terms of providing social and emotional support, the learning outcomes associated with interaction were undefinable, unmeasurable, and therefore of questionable value to her. She commented,

> The belief is that interaction is of some significance. The problem, at least as I see it, is that it doesn't seem clear in anybody's mind quite why or what the nature of interaction should be or if interaction *per se* is fundamentally good. So there's ambiguity and ambivalence about that. From my point of view, certainly I was entirely in support and in agreement that we needed to increase the opportunities for connectivity between students and professors and among students. So fundamentally it seems to me that that's an appropriate goal, but I would certainly admit to there being ambivalence on my part. . . . I had not much, but a little experience with teleconferencing and the same claim is made of teleconferencing that "It's a wow, it's a marvel, and it's a must" because of interactivity. Well, my experience with teleconferencing was that it was like pulling teeth to get any level of interaction. I went through a repertoire of strategies in that experience – you know, giving people little tasks to do, giving them opportunities, setting conditions and problems that should have produced interactivity – and was terribly frustrated. Then, after that experience, I talked to the teleconferencing coordinator and he said "Oh, this was much more interactive than most," and I said, "What?" So what I'm saying here is that the claim that these technologies are interactive and that interaction is good is one thing, but the realities are somewhat mixed. (Int. 2, p. 1)

She also observed that the term "interaction" was often attributed to the phenomenon of many students speaking. She found that students were sometimes not digesting, reflecting on, and responding to the substance of messages posted by others. Instead,

> they were reading their books and assignments and activities and so on and they would then sit down and devise a comment. It was almost like put the record needle on, I play, lift mine up, he plays, lifts his up, somebody else plays . . . . (Int. 2, p. 13)

Part of this behaviour was attributed to unclear conference topics and lack of specific directions to students about the appropriate quality of thought expected of their contributions in the first offering of her course. She addressed these problems, and subsequent conferences tended to be less problematic, though she still had concerns about the value of such "non-prescribed" learning outcomes.

Doreen also expressed ambivalence about the value of various types of instructional strategies and practices suggested for the CMC environment. As she noted,

> Maybe it's my own naiveté, but I just looked at [variations in CMC instructional practices described in the literature] and said, "Hey, that's personality. How I manage that and how you manage that, I don't think that's a key issue for the students." Students are extraordinarily forgiving. They'll let you be you, as long as you don't waste their bloody time, and don't hassle them, and answer their questions – things like that. Don't be arbitrary. These are adult people who give you the same opportunities and respect as they would give you in any other social circumstances. Your style and your role – some of them will like you better, and some of them won't. Why would that change [from classroom reaction]? (Int. 1, p. 17)

Though Doreen still had reservations about the utility of some forms of CMC like computer conferencing, she was committed to using CMC because she felt it had a number of advantages. It allowed her to communicate efficiently and effectively with students who needed learning time- and place-flexibility. It also provided potential benefits for students in terms of increased interaction among students and with the instructor.

She considered anytime, anyplace informal communication among students to be an important feature of CMC, and so provided students with information to increase private interactions. She stated,

> I think the really profound effect [of CMC] is being able to communicate with you, with me, or another student, any time. The first thing I give the students is a list and logins of all the students in the class. Not only do you meet them [in the computer conferences], but you've got their e-mail addresses. Let's say that Frank says something of interest, or something that pisses you off.

> You've got his e-mail. You've got his login address. You can talk to him directly. (Int. 1, p. 12)

Computer conferencing also provided interactivity for isolated students. Referring to her first on-line class, she remarked that

> . . . they were over 50% rural. That's very unusual. And the rural is real rural. We're not talking St. Albert, we're talking La Ronge. We're talking Iqaluit, Arctic Bay, Fort MacPherson, and these places where the alternatives for them just don't exist. And those students coming from those places are absolutely delighted [with CMC]. (Int. 1, p. 20)

She also saw other advantages to the medium. For instance, misunderstandings, corrections, and clarifications could be communicated more effectively because students accessed this new information when it was convenient for them, and they had a permanent record for future reference. It also provided a forum for all student voices to be heard and greater potential for empathic understanding. She explained,

> I think everybody in a [computer] conference does more listening than they might otherwise do. You know, [in a classroom,] while Frank is busy talking over there, I'm sort of planning what I'm going to say next. [With CMC,] even Frank gets heard. They can choose to throw it out or not. But the opportunity for him to be heard is actually there. So I think you do learn a great deal more about people. (Int. 1, p. 18)

As a result, she rarely (and then only by private e-mail) asked students to reduce the length of their contributions if she perceived these as unduly long or confrontational. Rather, she relied on other students to handle these types of messages as they saw fit. She noted,

> I think there was one case when I went in the background by e-mail, not directly, and said, "That's a bit much and a bit oppressive, would you like to back off gently?" but I did almost none of that. I let the students see it themselves, and what I found in both my little survey with them and the evaluations, was that they were actively saying things like, "Frank, or John, or Mary, or whomever, they just never shut up. But I really liked conferencing, because I could ignore their input. " (Int. 1, p. 10)

Doreen noted that the relatively anonymous nature of computer conferencing, coupled with the existence of a permanent record of contributions seemed to reduce sexual bias and make the learning process more egalitarian. She found in her academic career that male-dominated face-to-face interaction tended to mis-attribute women's ideas to men in order for the ideas to be accepted by the group. Computer conferences, on the other hand, masked gender identity to some degree and otherwise eliminated non-verbal cues (e.g., sexual attractiveness) that tended to perpetuate subtle biases, and also provided a record by which the originator of a particular idea could more easily be determined. Consequently, what people said, rather than who said it, tended to be more important and more easily verified in the electronic environment, she found. This was an important feature of computer conferencing to her.

Doreen found relative rates of student participation were similar between computer conferences and the classroom. Though her students were required to at least sign-on to the computer conferences, only about a third of the students did the bulk of the interacting. A small group of students refused to participate at all, and the remaining students occasionally contributed, being more content to lurk for the most part. She felt that overall participation levels in graduate-level computer conferences might be slightly higher than those in classrooms, but that this could mask the possibility that various types of learners were being affected differentially by the medium, some positively and some negatively.

Still, she considered computer conferencing to be of relatively unknown value in the educational process at Access University, partly because the medium had never been used on a wide scale. The print-based, telephone tutor support model had dominated the institution for many years, and alternative instructional mediums had not been particularly encouraged.

She commented,

> In my view there is an awful lot to be learned about what we're doing [with CMC] because in distance education when we began developing instructional materials, we got quite good at converting the instructional activities from the classroom to textbook to printed material to video to audio even. But I don't think we know about [CMC]. (Int. 1, p. 25)

In addition, the appropriate uses of CMC were still relatively unknown because theory supporting the medium was still contentious, in her opinion. She cautioned that this needed to be more adequately developed before the medium could be used to its full potential, stating,

> The interaction issue – the literature seems to me to be quite ambiguous and quite dangerous. There's a whole literature that fundamentally seems to be saying, "Interaction is good because it's interaction." I can't accept that. I think that there is something useful about interaction, but it seems to me that it needs to be more specific. To what end? In what way? (Int. 1, p. 25)

Heather

Heather had taught five on-line courses prior to our interviews. Although she had the least experience in distance education of all the interviewed instructors, she was the most experienced CMC instructor by the time the interviews were conducted.

Her course is required in the M.Comm. program. It consists of a set of readings and a print-based text. Computer conference topics related to specific sections of this material. Heather's class sizes had ranged from the approximately 70 students in her first class to approximately 45 students per offering after that. The May intakes were generally smaller than the September and January ones.

Heather felt that computer conferencing contributed to the development of group knowledge. As an instructor, her primary goals in designing computer conference activities were to create dialogue in order to help students apply course concepts to their work situations and resolve real-life problems, to engage her students in discussions about management issues raised in the accompanying instructional material, and to encourage them to critique various conceptual models based on their work experience. Though she did not have specific, stated learning objectives, the discussion questions in the instructional material were designed to tie into an overall framework of strategic management that was used throughout the course.

She divided each electronic class into groups of ten to fifteen students. Each of these smaller groups answered questions related to nine course-related topics, then discussed issues which arose from these topics in their applicable "Symposia" computer conferences. In addition, the groups analyzed five cases in other, separate computer conferences. There were also two individually-submitted assignments in the course. Information used to complete these assignments was drawn from the course material, individual research, and computer conference discussions. Computer conference participation was initially assigned a 10% grade weight. Heather later increased this to 20%, in response to some students' complaints that their efforts were being under-rewarded.

She allowed students to discuss these Symposia questions in whatever order they desired, and throughout the duration of the course. She did not deliberately "gatekeep" – that is, control student access to succeeding topics – because the discussion topics related to specific points in the reading material. As a result, this tended to control the pace of student discussion somewhat. It still provided some flexibility for individual students, though. She stated,

> You can't take [flexibility] away from [the students] because some of them are traveling, they're having babies, they have a parent who passes away, these kinds of things are happening. A lot of [circumstances] have to do with their job demands. They can't all work consistently in sequence with one another so that they're all doing [the same] questions at the same time. (Int. 2, p. 13)

Heather employed a variety of methods in her courses to encourage early electronic student interaction because this seemed to have a significant impact on the amount of subsequent conferencing activity. She posted a welcoming message to her students at the start of each course, outlining the method of evaluation for the course in general and her expectations of students regarding conference participation. She reviewed individual responses to identify non-participants early in the course, generally in the first two weeks, and posted messages for the group throughout the duration of the course indicating where they should be in the conference activities. Requiring the first course assignment to be completed soon after the course commenced also seemed to bolster later participation levels, she found.

Her pacing functions were fairly minimal. At times, she did find it necessary to prompt individuals or the whole class to speed up their discussions of the cases, particularly near the end of the course. Generally, though, this was not necessary. She found that only "a handful" of students needed prompting to keep up with the various conference discussions and that a sufficient number of students generally flowed through the conference topics at a similar pace and in the same sequence to facilitate interaction.

There were various factors that discouraged straggling. For instance, slower students found that their conference participation marks were adversely affected because the topic had usually been covered thoroughly by the time they participated. As a result, they had little of value to add and few other students would respond to their contributions.

To develop interaction in the computer conferences, Heather primarily encouraged students to relate their personal and work experiences to the course material and conference discussions. But she also took an active role in the discussions and looked for ways to share individual knowledge across students in the group.

She remarked,

> You have to follow through on their discussions. You have to facilitate. You have to probe. You have to prompt them. You're not just baby-sitting. You're actually involved and you're using the on-line discussions as a way to expand and add value. . . . So if you can really think of ways that they're going to be able to share and transfer their learning across the groups, amongst each other – I think that that's what makes [computer conferencing] really effective. (Int. 2, p. 18)

Heather also used enquiry to prompt students to think through issues more thoroughly (e.g., "Why do you think this is an important question?"). She found that this initial effort usually prompted a general development of the issues by the group, without a lot of need for specific direction from her thereafter. She would not hesitate to prompt students to participate, but rather try to "loosen up" individuals to get them to engage in free-flow discussion by publicly asking them if they had personal experiences to share with the group which were applicable to the issues at hand, or by specifically mentioning their name on-line and asking for comments. She also tried to develop interaction and a free-flow conversational feel to her conferences by encouraging students to use humour. She recalled one such incident that spurred student interaction:

> One student kind of got the group discussion going. At the beginning of our course materials, there is a framework developed by Edgar Schein about different assumptions [regarding] man . . . [concepts of] economic man, social man, complex man. The assumptions are laid out for each. There wasn't much happening, and then one of the students said, "I discussed these various concepts with my wife, and she informs me that there's no such thing as a complex man." That just broke the ice right there. (Int. 1, p. 19)

She noted that ensuing responses to these anecdotes tended to sidetrack the discussion at times, but that she was able to steer the conversation back on track. The benefits to the overall participation levels from encouraging or using humour usually warranted the risk of offending participants or of deviating from the general thrust of the conference.

During the course of the various conferences, Heather would often refer to issues reported in the daily press or published in the literature which related to the course material and conference discussions or supported someone's point of view expressed in a conference. The asynchronous nature of the medium allowed her to more thoroughly research, evaluate, and summarize this additional information before disseminating it to her class. Because this material was accessible to students throughout the course and afterward for their reference, she also felt that it had more lasting impact than in a classroom setting.

With experience, Heather increased her summarizing and weaving functions and came to consider these as the most important means of sharing knowledge within the group and encouraging interaction. Though difficult at first, she stated that the process grew easier with practice. Despite these efforts, participation was not uniform across classes. She explained,

> Each group is different, because some groups participate to greater degrees than others, no matter how much you try to get them engaged. There are some groups that just never seem to really get into it. (Int. 1, p. 22)

Heather publicly acknowledged minority opinions as valid, and encouraged dissenters to continue on with their trains of thought after checking privately to ensure that the student wished to be engaged in the debate. Often students could not anticipate that some of their comments would meet with significant opposition. She noted,

> I make it clear to students with minority opinions that I want them to be honest and open. . . . I'd like to get these [contentious issues] out in the open so we can discuss them and get some feedback on them. I want to legitimize what the student is saying so that [she/]he won't just clam up and be afraid to bring up those points again. (Int. 2, p. 16)

She attempted to acknowledge the validity of dissenting points of view and gave positive reinforcement to her students. It was personally important to her to ensure that a particular student was not ridiculed or put down for expressing a somewhat unpopular view and that these views were adequately communicated even if others disagreed with them (including herself).

She did observe substantial conflict among her students at times, generally as a result of differing underlying political perspectives which informed a particular discussion. If this occurred, she attempted to point out legitimate points of view on both sides. She also attempted to let the group decide the direction that they wanted the discussion to go. However, if the discussion was eventually reduced to only two or three participants and the rest of the class appeared to have lost interest, she would intervene and suggest that the remaining discussants either drop the debate or continue it through private e-mail or in a "Roundtable" database specifically set up to discuss unresolved issues that arose in the M.Comm. courses.

As her courses progressed, Heather noted that students tended to mute their responses to others they found to be habitually provocative or controversial. They seemed to impose their own limits on acceptable levels of dissent, not so much out of unwillingness to understand, but because they felt that once they were familiar with the views of the dissenters, they were not willing to spend more of their own time in discussion. She commented,

> There are certain people who really tend to be controversial, and by that time students are saying, "We've been through this before, we know where you're coming from, and we're not going to waste anymore time on it." (Int. 1, p. 22)

However, conflict among students was not that frequent in her experience. The anonymity afforded by CMC seemed to produce civil interchange for the most part.

Heather did not find clarification or resolution of misunderstandings to be a problem in the computer conference environment, particularly when she was reading conference discussions frequently. She found that the alternate "views" of her conferences provided by Lotus Notes® allowed misunderstandings to be flagged and drawn to the attention of students because they were able to read these in the context of the original discussions if they desired. In many cases the participants also prefaced their remarks by either referring to the relevant prior message(s) or incorporating actual quotes from the message to which they were responding.

Heather noticed several improvements to student learning patterns in the CMC environment compared to her prior graduate-level classroom experiences, though she cautioned that these observed differences could result from the greater average age and years of work experience of her on-line students. In classrooms, students generally resisted her attempts to get them more involved and responsible for their learning, and seemed to expect her to be somewhat of an entertainer. This behaviour was not as prevalent in her electronic courses. Students seemed to assume greater responsibility for their own learning as the course progressed by spontaneously taking on more probing, questioning roles in the conferences and bringing up points that had not been dealt with by other students or the instructor, for instance. She found that dividing the class into smaller numbers created greater group pressure for students to participate in the computer conference discussions because non-contributors were more obvious. This allowed her to assume more of a facilitative role which she preferred because she did not consider her classroom presentation skills to be strong.

She felt that her on-line students talked more freely about their personal lives and experiences than in the classroom. Heather observed that students also seemed to be more confident in their responses because they were able to carefully research, structure and re-consider comments before submitting them to the conferences. As a result, she found that the electronic conversations were not only more interesting than classroom discussions, but also broached controversial subjects more often. She had witnessed several instances when students had submitted unsolicited, well-researched contributions after independently exploring a particular topic of interest.

Students in her computer conferences were able to conduct more and better-quality research compared to their classroom counterparts, she felt. For instance, the asynchronous nature of the medium gave her students the ability to compare and standardize their measurement criteria on survey instruments they administered independently in a wide variety of work settings and report these findings to other students for discussion at their convenience. Computer conferencing also gave students more "classroom" time to discuss these issues. This produced superior research practice and conclusions, in her opinion.

However, Heather also noted some negative effects of CMC on student learning patterns. Students tended to resist deeper levels of analysis and critique of course content, for instance. She needed to probe students to get them to think more about fundamental underlying issues and encourage critical reflection. She sometimes attempted to aid this process by inserting exemplary student contributions from other conferences or prior courses.

Although there were significant amounts of group discussion in her computer conferences, the lack of group-based assignments concerned Heather. This was partly due to her lack of technical knowledge about how such activities could be set up in the CMC environment at the start of the program. These problems were being addressed at the time of our interviews, so she expected that subsequent offerings of her course would include more of these learning exercises.

Heather assessed computer conference participation primarily on the quality of individual student contributions, rather than frequency. Part of this assessment was based on the extent to which students questioned and probed the contributions of other students. She also systematically reviewed each student's submissions in two key conferences at the end of the course. By participating in the conferences almost daily, she found that she became familiar with the quality of various students' comments. Teaching the same course several times gave her another point of comparison. Although she found there were several alternate means to assess quality, this was a time-consuming process.

The amount of private student e-mail directed to Heather had decreased with the introduction of the "Coach's Corner" database which allowed students to post private queries about a broad range of questions that might not be directly related to a particular course, or which dealt with administrative matters. These messages were usually read first by graduate student assistants, who often responded to queries without forwarding them to the instructor. Eventually, much of the private e-mail that was sent to Heather asked her advice about how to handle specific human resource issues at students' places of employment.

Heather had not found a way to efficiently mark student assignments that were electronically submitted. She printed these off, made hand-written comments on them then typed in the comments and sent them back to the students in an e-mail message, appropriately referenced to the assignment. Although the CMC software allowed comments to be typed directly into the electronic assignment, she found that this was a cumbersome process that took large amounts of computer storage to hold the electronic assignments she received. Despite the potential for CMC to reduce turnaround time, she still found that it took seven to ten days to return assignments to students because she did not mark quickly. Despite the lengthy amount of time she devoted to marking, she did not plan to reduce the amount of feedback or the length of the assignments.

She stated,

> It doesn't seem very efficient, but I know that it's highly valued by the students, so I think that's what motivates me to do it. I get a lot of feedback on the feedback that I give to the students. They really appreciate it. They find it's very concrete and helpful. (Int. 1, p. 4)

Class sizes had been reduced in the program as a whole from over 70 students per course to about 45, largely to make the assignment marking more manageable for the instructors. Prior to this, she had found the overall time demands to be excessive. She stated that for the first class of on-line students in the program

> . . . we didn't [adapt marking and assignments]. We suffered through it. I suffered through it. It was the first time around. It was very demanding. I was working weekends, evenings, everything to try and keep up. (Int. 1, p. 3)

Still, like other instructors, Heather found the CMC medium had some compensating advantages. She found that she learned a great deal from the students because of their age and years of work experience. Computer conferences were also like documented conversations to her where

> I can get immediate feedback about what [students are] learning. Some of them go away and they actually take a questionnaire, or they do a discussion with their employees around certain issues, and then they come back and they tell us what that feedback has been. Or they suddenly see that they've been limited in how they've been perceiving a situation. And that feedback comes back right away. It's just great. (Int. 1, p. 12)

Alan

Prior to my interviews with Alan, he had taught or co-taught two courses in the M.Comm. program, one four times, and the other one time. Computer conferences are used to discuss various management issues, often using case studies. In one course, there were approximately 70 students in the fall offerings, 45 in the January offering, and about 20 in the May intake. There were about 60 students in his other course.

Alan believed that he needed to teach in order to be an effective leader in an educational institution. In addition, he was interested in the development of electronic learning systems and students' responses to them. He enjoyed teaching in the M.Comm. program in particular because of the high calibre of the graduate students and because it was a good opportunity to extend his own knowledge and research base.

One of the major advantages of the asynchronous, electronic learning environment to Alan was that it enabled students to integrate personal experiences more effectively with acquired concepts. They were not constrained by limited classroom time. He stated,

> What my problem is with the classroom environment is that time intrudes in a different way. The room is booked for three hours and that's the window. . . . So my view is that you may hit some of the same buttons from a teaching point of view but from a learning point of view you probably are only hitting about a third of them in the classroom environment. Electronically you're more likely to be hitting more people with more of the learning buttons. They may all have the same understanding of this model whether they're taught in the classroom or taught electronically, but their integration of that understanding with experience is less in the classroom than it is electronically, I think. (Int. 2, p. 7)

Unlike traditional distance education and other CMC-based programs that used less-robust electronic learning platforms, he found that the Lotus Notes® software used in the M.Comm. program encouraged instructors to develop innovative approaches to learning and creatively respond to unforeseen developments. One example he cited was the use of a case study in the comprehensive exam (written after the first-level courses are completed in the program):

> We decided to profile a major corporation and a month before the exam date to send them essentially a case file about this organization. For this coming exam we chose a company in Vancouver called [Company X]. On [a certain date] we posted a 21-page case description of [Company X], plus an appendix of the last three years' financial statements. [A week later], the Vancouver Stock Exchange ceased trading the shares and began legal proceedings against the CEO. Six days after that, [Company Y] of Toronto took over [Company X] and fired all the employees. So here we were moving towards an in-basket set of problems at the end of the month, for a company that no longer technically existed. We had to update our electronic systems daily with news and information about [Company Y] and developments in the company. Our students are in the middle of a maelstrom of legal issues and fiscal issues and staff issues and so on. It's turned out well from an in-basket design point of view, because we've now designed a set of in-baskets which are really very current. What this example shows is that we can deal with changing business environments quickly. And I don't think you can be that fast, to get to this distributed group of students in this way, without the kind of technological resources that we have. I think perhaps the biggest thing we've done is to take more risks than we might need to, just to push the envelope, to see what we

> can do and what we can get away with. And I think the comprehensive exam is an example of that. (Int. 1, pp. 11, 12)

However, he also noted that service level improvements created other unanticipated results. As an example, the provision of up-to-date exam material described above created expectations among some students that the exams should be marked and returned more quickly. Alan remarked,

> The issue for us now is the time scale. We're doing things faster and the pressure from our customers is to go even faster still. (Int. 1, p. 12)

Students not only expected increased service levels in terms of reduced turnaround time, but also in the level of overall quality of the program. CMC somewhat enabled this, Alan found. Students were quicker to complain about poor instructors because they paid high program fees and rightly expected excellent teaching. E-mail feedback from students allowed remedial action to be taken more quickly by Alan as a program administrator compared to other educational programs he had managed.

In one instance, a person who had come highly recommended as a classroom instructor was contracted to teach an on-line course. Students soon complained about the instructor's lack of technical and on-line social skills. He was removed as the course instructor only a few weeks after the course commenced when it became apparent that these problems were serious and continuing. Alan recalled,

> There were 63 students in that course. I got 60 [e-mail] messages from different people on the same day saying. "We have a problem." Students in conventional universities put up with this stuff. What you do is stop going to the class and you start reading the book and you get around this somehow and you say this is the norm, we just have to deal with this. We can't do that [in the CMC environment]. We have no option but to work on the system. The problem [in a conventional university is that] you don't hear about it soon enough to act that fast. (Int. 1, pp. 9, 10)

Alan noted that CMC produced other unexpected benefits for students: Nation-wide electronic communication enabled unique collaborative research to be undertaken.

For instance, each student in one of Alan's classes interviewed several local store managers of a Canadian retail chain regarding implementation of head-office strategy to counter the effects of a large U.S.-based retailer's entry into the Canadian market. Differences between the stated head office strategy and the perceptions of the local store managers were discussed in a computer conference, and revealed significant discrepancies in perspectives of the two different levels of management. Alan explained,

> [The students] came back and said, "Hey, there's no real strategy here. The company thinks they've got one, because we'd interviewed the head office and they said, 'This is the strategy.'" We said, "Why don't you tell your managers?" And they said, "We have, did they not hear it?" We were able to show the management team in the central offices of [the Canadian retailer] that nobody was hearing them out there. So they did some things about that. (Int. 1, p. 13)

The resulting information was not only used in the course, but was able to be sold back to the retailer. The research process had enabled information to be gathered by the graduate students about the company in a more cost-effective manner than head office managers could have done.

Alan considered that computer conferencing produced a distinctively new form of learning at a distance because it gave voice to the various life experiences of many adult distance learners for the first time. Course instructors could also assume a more facilitative role than previously possible, while still providing expertise, primarily through the written instructional material. This provided a more adult, learner-centred form of education. As Alan noted,

> Sure, I know more about this stuff than they do – that's why I'm teaching [it]. But they actually have more experience at this stuff than I do so it's matching my knowledge with their experience that we're trying to create here. So the writing of the material is about creating the triggers to bring out that match and the teaching work is about facilitating the learning conversation around the kind of framework that we're jointly exploring. (Int. 2, p. 6)

He viewed dialogue, including that which took place in computer conferences, as a means to build new, group-based knowledge. In an introductory message to one computer conference, he commented,

> I want to invent knowledge through dialogue . . . to use the [computer conferences] to explore and better understand what it is that we already know and understand about change. In fact the major assignment is about creating a knowledge bank of our collective understanding of the nature of change as it relates to both leadership styles and to scale of change. ("So the Ferret is Back" message, Coach's Corner database, September 4, 1996)

Alan stated that his philosophy as a distance educator had changed over time. Initially, he strove for excellence by trying to produce the best print-based instructional and assessment material possible for students. Partly as a result of the opportunities afforded by CMC, he gradually adopted a more learner-centred focus which emphasized the value of collaborative learning to build new group-based knowledge. This shift in perspective was a conscious one in some ways, arising from a related philosophical premise of his that traditional, authoritarian instructor-student relationships needed to be replaced by more egalitarian ones in most adult learning situations. He now saw his instructional role as helping students to create their own learning experiences. He stated,

> I think teaching is dead. What we're moving to is learner-based learning. That is, I see the role [of instructors in the program] as creating triggers for learning which stimulate people to share their understanding and knowledge that they already have or to explore with others in a learning network what new knowledge they can create by working together. One of the lines I have about this place is that, "We're not in the teaching business, we're in the learning business," which is fundamentally different. And that's a shift for me personally, too. I think what I have done is shifted from focusing upon my ego needs as a teacher to the learning needs of my customers. That's been an interesting journey for me. (Int. 2, p. 2)

As a manager, one way that Alan believed these learning needs could be deliberately encouraged in his graduate program was by exchanging instructors' authoritative pronouncements with more facilitative conversation in the computer conferences. He remarked,

> I'm trying to shift the work of other [instructors] from an instructional role to a coaching/guiding/mentoring role for a better learning conversation. And to do that, we have to in a sense take a lower profile than we might otherwise do and create a different kind of conversation for students. Rather than saying, "Yes that's right you've clued in, there's still this, now let's move on," [we should say], "Yes, you've got that right but there may be some other ways of thinking about this, what do others think?" That's the conversation that I want to create. (Int. 1, p. 5)

Alan also allowed several months to pass between the time he finished writing material for his course and its commencement date, in order to become more of a participant than "the instructor." He explained,

> I think there's a danger in writing a course and having a course ready to go and teaching it almost instantaneously because you don't have time to worry about how students will deal with it. You're so into the course materials. You know what it is you want them to do. You understand what you expect here. You have a sense of how this dialogue might go because you've just been immersed in it for a couple of months. When the thing starts the day after you've handed the course over, then you're trying to guide it in a particular kind of way. In my case, I finished writing this course in May and I'm teaching it in September. During that time I've spent two days with [subject matter experts from a foreign country]. I've spent another ten days working around the same kind of stuff in different environments. We've had a summer school where I was exploring this model as part of what we were doing with the students and I have now come to the conclusion that I have no idea what the students are going to produce for me in relation to the assignments in this course – which is good, because I can now participate more equally with them and I am not going to be trying to look for clues to what it was I was hoping to get in the first place. (Int. 2, p. 6)

Overall course design also contributed to successful computer conferences, he found. Several different database designs were needed to give students alternate learning triggers to aid their comprehension of the concepts discussed in the course. Further, the instructional material needed to be part of an unfolding dialogue provided to students at appropriate points in the course, rather than a comprehensive set of materials provided at the start of a course. The ability to electronically disseminate information to spur conference activity as it was needed was an important feature for new models of time- and place-independent distance education because this produced better interaction at various stages in the course, in his opinion. He noted that

> the way we usually write distance learning courses is to tell the whole story at once and then hope people will use it. What I think we've been doing from a [CMC] course design point of view is telling enough of the story at once for you to make sense of it and keeping some back so we can use it in [the reflective part of the course's computer conferences]. (Int. 1, p. 23)

Alan used several specific techniques to encourage and maintain group interaction. He found that awarding marks for participation was one technique, but he perceived this as somewhat of a necessary evil. The previous learning paradigms that most students operated in (knowledge transmission from a dominant instructor to submissive students) made it difficult for students to see the intrinsic benefits of a learning model where students and instructors were a community of co-learners engaged equally in joint knowledge building.

To encourage participation, he encouraged students to "tell their stories," because he considered personal experience to be an indispensable means to engage both the teller and the listeners. He considered that his role as an instructor was to connect discussions back to the more theoretical or conceptual information contained in the learning material and create shared knowledge by identifying commonalities among the experiences related by participants. This process generally acted as a springboard for further student discussion, but at a deeper level of analysis. He commented,

> The more important thing I have to do is to try and get that conversation you started to lead somewhere for other people. So my job is to essentially create a learning network or a web of ideas that people can connect to. (Int. 1, p. 5)

Alan found that he needed to individually prompt more people to contribute in the computer conference environment than in the classroom. His methods of drawing reluctant students into computer conference discussions depended in part on information contained in the each student's "personal profile" – electronic biographies volunteered at the start of the students' program containing information about their interests and employment history, for instance. He then used this information to tailor specific e-mail questions to try to connect the conference discussions to the students' life experiences, and encouraged them to post their responses to the applicable computer conference.

To assist in the interaction process, he regularly identified new, relevant information from recent journal or press articles and posted these to the conferences. He also tried to keep the discussions focused on the applicable learning issue, and not let student comments degenerate into bitterness or anger. Humour was an indispensable part of the electronic conversation to him because it helped students to maintain a healthy perspective.

He also required the first course assignment to be due within two weeks of course commencement, to encourage early conference participation. His feedback on these assignments indicated if students had lost marks because they had not incorporated perspectives or issues discussed in the conferences. Thus, the students quickly learned that conference participation was both expected and beneficial.

Though asynchronous communication provided flexibility for students and enabled group knowledge building, Alan felt that overall structure still needed to be maintained in the conferences and other areas of the course to maintain student success rates and develop good student work habits. Adhering to fairly strict assignment deadlines helped. As he stated,

> I've always believed in structured, paced learning. . . . I mean we frog-march people through this stuff. I think that's a very healthy thing to do and our success is partly about pacing. So we say, "This assignment is due on this date, posted in this box." We have a database that you're supposed to post these assignments. Once you've put it in there, you can't get it back. I'm the only person who can access that database plus one of my staff here. Let's say

> the assignment is due today. You post it today. Our staff will then check that you've posted it and if you haven't, they will then chase the hell out of you to get it in today and you start to lose marks for every day that you're late, because we treat this as if it was a work skill, a business skill. We've asked you for this report by Monday morning and if it ain't there you could get fired so where is it? So it's a discipline that we get you into. (Int. 2, p. 14)

Alan specifically looked for non-participants in the first few days of commencement of the course, and contacted them privately by e-mail or publicly in the conferences, encouraging them to contribute. Graduate student advisors also actively reviewed conference activity in each course, and notified him when it appeared that a student had not recently contributed to the conference.

Collaborative learning activities were a significant part of Alan's courses. He used various techniques to assist this process, most of which were no different from those he used in the classroom. To provide maximum benefit from group learning activities, he encouraged other students to respect the expressed differences within the group and assisted individuals in developing full, rigorous arguments and counter-arguments as they worked toward mutual understanding and (hopefully) consensus. He sometimes did this through private e-mail communication, but generally this was accomplished by critiquing the students' points in the computer conferences.

He also found that group members had to be prompted to take on various assigned tasks. He remarked,

> We actually had to structure the groups to get them to move. . . . We said, "Look, you need to assign these roles in your team. You have to sort out who's going to take the responsibility for ensuring that the document that you as a team have to produce and post on a particular date is going to be on the system. Who's going to take that leadership role? Who's going to take the role of coordinating effort – making sure that everybody's doing their pieces? Who's going to take the role of critic of your own work? Who's going to take the role of critic of the other team's contributions?" Distribute these kind of functions and then move them around by case so that at the end of the six cases you've done three or more of these different functions in your team. Then we asked them to

> spend some time reflecting on how they could have improved their teamwork in this virtual environment. (Int. 1, p. 13)

Alan welcomed challenges to his expertise from students and the opportunity for debate. He explained,

> For me, the cut and thrust of debate is what I was brought up on. I'm also a very skilled politician, so I'm just used to being in that kind of environment. It doesn't affect me a lot. (Int. 1, p. 3)

Though he welcomed these challenges, he also set rules of engagement. He told his students,

> If you have an issue with me as a professor that you think affects the group, then rule one is, "Don't ambush me." Give me a chance to think about it. I don't mind being challenged but I'd like to know it's going to happen so I can think about how best to respond. But I don't mind being taken on at all. (Int. 1, p. 24)

However, he noted that other instructors (though not any interviewed for this study) had felt quite threatened in some instances, by "students who just won't take stuff from the profs." In his experience, this generally resulted not from differences of opinion about discussion topics, but from questionable instructional practices.

Alan often found that student-to-student conversations that took place in the computer conferences were valuable learning experiences. Interchanges usually exhibited greater levels of thought than those in graduate-level classroom seminars because students were able to read, think and construct replies before posting them to the conferences. He noted,

> You have a chance to really work through some ideas before you put them up there; whereas in the classroom, when your mouth opens, that's it. It may be a small point, but it's a massive point in terms of the quality of materials that we see. I think there are lots of examples where the system has encouraged wider reflection. (Int. 2 p. 4)

He suggested that the ability of students to spend more time on task as a group also improved overall student contributions compared to the classroom. He noted that some of his groups of students had produced stellar work by interacting asynchronously with each other for many hours. The electronic learning environment not only allowed them more time to individually reflect on the course material, but also gave students the freedom to collaborate for more extended periods of time than in the classroom setting. He found that students willingly committed time to group discussions because of the better quality of learning that they experienced in the asynchronous electronic environment. They also took on greater responsibility for group participation and provided significant social support to each other which was generally unavailable to other types of distance education students. He commented,

> Whenever somebody started to feel a bit "iffy," the rest of them have actually got together and sorted them out. By the time we've known about it, one of the group has said, "John's had this problem but we've dealt with it. You might want to send him a note saying, 'Glad you're still with us,' or whatever." [Students provide] absolutely, absolutely a lot of social support.

While noting that "loud" dissenters were present in both the classroom and electronic environments, Alan perceived that computer conferencing represented a broader spectrum of opinion because it allowed shy students to become more assertive, and encouraged dissenting or frank comments from those students who might otherwise be unwilling to disrupt the flow of classroom conversation. A richer tapestry of student experience and opinion resulted. He actively supported unique points of view, largely because of his personal experiences. He stated,

> [My] teaching style is to encourage [expression of minority opinion] because in my own career I was always off in left field somewhere. I have a lot of respect for people who are taking a kind of a deviant view. That's how I made my living for a number of years. (Int. 2, p. 13)

He noted several problems that students experienced with CMC as well. The number of conference messages was sometimes overwhelming, and some of these were difficult to read and comprehend quickly because they were unfocused. However, he found that this problem gradually disappeared as students proceeded through the program and improved their writing skills.

Alan discouraged student-to-instructor private e-mail communication, because of concerns expressed by some students about unequal access to the instructor's time that resulted from this practice. If students sent e-mail messages to Alan that could be of interest to others, he usually asked these students to post them in the applicable conference, and posted his responses there as well.

Alan noted some of the unanticipated benefits of the asynchronous, electronic learning environment – for instance, the ability of students (and instructors) to get help with real-life problems they face in their workplaces. He remarked,

> You can pose a question that's real for you like, "What do I do with this staff member on Monday that I've got to deal with?" and you'll get [a number of] responses that really are helpful. I don't know where else I can get that kind of feedback, quickly and focused in a supportive way, than in this kind of environment. (Int. 2, p. 8)

He also found that the experiences students related in the conferences were often intriguing to him personally. He explained that

> [students are] sharing a lot of information about their own companies and their own organizations. Some of the stories of course are fascinating and you'd like to see what happens next. Some of these stories are a bit like soap operas so you get hooked. (Int. 2, p. 18)

Despite the detail in some of the accounts, he found that students exhibited remarkable discretion in their comments and observed a set of unstated ethical rules that bounded the conversations.

He also perceived that the technological features of Lotus Notes® enabled students to quickly learn valuable information management techniques – for instance, the use of "intelligent agents" to flag certain kinds of messages or keywords in messages for immediate review, and generally manage large volumes of messages.

He noted,

> [O]ne of the things [that Lotus Notes®] can do is that if there are themes you're interested in a particular course, you can create intelligent agents that search all those messages for just those that deal with those themes. So we're showing people how to read differently, how to think about knowledge and information differently, how to use the systems and their intelligent agent functions to get more out of these resources. For example, mine's programmed to pick up any message coming in, anywhere on my system. I'm running, I don't know, 160 databases here – anything to do with organizational change and transformation comes into a single place. I read those all the time, first. Any messages from my staff come into a separate place and I read those. What we're seeing is that people are mastering the competencies that they need to be effective in the program reasonably quickly. (Int. 2, p. 9)

Alan principally assessed the quality of individual student contributions by reviewing the content of their conference messages. Quantity of postings was a minor factor to him. He commented,

> It's not a question of volume here. I mean one single message may change the whole thinking of everybody. So I cannot escape the job of reading every message in the course I'm responsible for. . . . We do actually count messages and say, "Look, Ben's done 196 messages in eight weeks and Mary's done 10. Let's look at both, in terms of quality and quantity." And then you'll see that 190 of these 196 messages are, "I agree. Stop. Ben." So there's actually six messages here. But you have to know that and you have to see that and you have to track that as you go through. (Int. 1, p. 17)

He found that this process was aided by the ability of Lotus Notes® to show various "views" of the computer conferences by topic, date, or individual. Further, the variety of on-line group learning activities made possible by using Notes® databases gave Alan a better feel for how well students were interacting with the learning materials and other students, compared to standard computer conference participation alone.

Although several alternatives had been explored, Alan found that his assignment marking methods were still rather inefficient. He printed off the electronically-submitted assignments, made handwritten comments on these, and sent the annotated assignments back to his students by post. He also sent an e-mail summary of the appropriately-referenced comments to the students.

Alan spent several hours a day on-line for the duration of a course. Still, he felt that these instructional time demands were not as a onerous as they initially appeared because CMC allowed him to use his time more effectively. He stated,

> Well I mean it sounds a hell of a lot, five hours a day, bloody hell, that's a bit. But you get up at seven, you log on for an hour, get a coffee, go for a walk. Log on at ten, do another hour. Log on at three, do another hour. Do that a couple of hours a day and be done. I mean you're managing it when you want, where you want. So it's not a big deal. (Int. 1, p. 14)

He suggested that CMC instruction could also be done in otherwise "dead" times – for example, while waiting in airports – and that it afforded a greater degree of flexibility in terms of location of instructors. Further, though the time demands were intense for the duration of the course, other professorial duties could be arranged to be carried on outside these periods, in his experience.

Summary

This chapter began by briefly describing and comparing the Master of Education and the Master of Commerce programs offered by Access University. All the instructors interviewed in this study taught in one of these programs.

The individual CMC instructional experiences of the instructors were then described. These accounts were primarily based on transcripts of two interviews conducted with each instructor between April and August, 1996. The accounts of their experiences form the central part of this study.

The instructors discussed various aspects of their CMC experiences – for instance, their educational backgrounds and the structure of the CMC-based courses they instructed, their perceptions about the nature of adult distance education and the role of CMC in this process, instructional and assessment techniques, observations about student practice and behaviour, and comparisons of their CMC instructional experiences with those in the classroom and more traditional (print-based, telephone supported) forms of distance education.

The unstructured nature of the interviews provided an excellent opportunity for the instructors to describe their range of experiences. Importantly, this interview process also allowed the instructors' words to reveal more fundamental, underlying perspectives which may have informed their experiences. Significant aspects of these experiences and perceptions will be discussed further in the next chapter.

Chapter 5

DISCUSSION AND INTERPRETATION OF THE FINDINGS

This chapter discusses the instructors' accounts described in the preceding chapter. It is divided into two sections. The first section groups the instructors' accounts into three categories of meaning that I considered informative, and comments on similarities and differences in their experiences within these categories. The second section discusses these experiences in the context of various learning theories, learner needs, instructor competencies, and organizational influences that may influence the practice of CMC instruction.

Significant Aspects of the Instructors' Accounts

Aspects of the instructors' accounts that I considered important are presented within three categories of meaning: perceptions about communication processes that occurred in the CMC environment, teaching techniques employed by the instructors, and the effect of CMC on instructional experience.

Communication Processes in the CMC Environment

In general, the instructors expressed a wide variety of perspectives about three aspects of the communication processes that they observed in the CMC environment – the value of the group communication and collaborative learning processes, the value of individual student contributions to the computer conferences, and the relative frequency of student interaction in computer conferences compared to the traditional classroom.

Group communication and collaborative learning processes. All the instructors agreed that the CMC learning environment was superior to the print-based, telephone-supported model characteristic of Access University undergraduate programs because of the increased opportunities for instructor-student and student-student interactions. They saw these interactions as more desirable at the graduate level, but for different reasons.

Some instructors considered computer conferencing to be central to the distance learning process because it promoted learner-centred learning and the creation of group knowledge among geographically-dispersed students. Others considered electronic interaction to be less important, but still useful. Randy, for instance, considered computer conferencing to be oftentimes unnecessary but important at other times, depending on the desired learning outcomes under consideration. In his opinion, CMC enabled students to share work experiences or to learn to communicate with each other on a professional basis at a distance. As a result, he saw computer conference participation primarily as a means for students to develop interpersonal communication skills and to exchange information informally. However, these were less important learning outcomes than mastery of course content. He considered individually-submitted course assignments rather than group interaction to be the primary means for students to acquire (and demonstrate) this knowledge, and viewed one-to-one interpersonal communications through personal e-mail or telephone conversations as more often helpful to this process. As a result, Randy generally used these forms of communication rather than computer conferencing to interact with students.

Doreen also viewed group work and collaboration facilitated by computer conferencing to be relatively unimportant to many aspects of the learning process. She was sceptical of the educational advantages of CMC cited in the literature, particularly the ability of CMC to facilitate relatively unstructured, group-based knowledge construction. Like Randy, she considered it necessary to have a clear understanding from the outset of the learning objectives of the course, and viewed computer conferencing as only one of several possible means to achieve these. Although she devoted a significant amount of time to computer conferencing (too much, initially), she also provided alternative means of communication (fax, telephone, e-mail) to accommodate her students' varied learning styles and preferences. She did not require computer conference participation nor attach a high grade weight to this activity because she considered these to be somewhat coercive instructional practices.

John considered computer conferencing to be necessary for interaction and the creation of new knowledge at a distance, though he expressed some reservations about the CMC medium in general and the conferencing system used in the M.Ed. program in particular. He was sensitive to the desires of some students to learn independently by not participating in the computer conferences discussions but still believed that the interaction provided by CMC was vital to the overall distance learning experience. It enhanced individual understanding and encouraged group knowledge construction in his view, even though he had not been able to successfully incorporate group-based assignments into his conferences primarily because of personal time constraints. He believed that group work was inevitably unproductive in those cases where participation was required. He also found that he was less able to encourage group-based learning in his computer conferences because the communication limitations of the medium tended to make spontaneous interaction more difficult. In contrast, Heather considered the asynchronous group communication processes enabled by CMC to be a superior form of learning because it allowed for time- and place-independent interaction among students, while at the same time facilitating collaborative learning processes.

Alan stated that his conception of the role of the instructor had changed from that of knowledge expert to learning facilitator as a result of teaching in the CMC environment. He considered himself as more of a co-learner who jointly explored and discussed issues with his students. Interaction was obviously essential to this process. Similarly, Mike considered group-based and experiential learning to be central components of the adult education process. He believed that discussion and dialogue were necessary for authentic learning to take place in any educational setting because this facilitated group knowledge building and perspective transformation. However, like John, he had been unable to incorporate much group work into his students' on-line activities essentially because of the instructional time required to do this. In his opinion, collaborative activity was limited by overall conference and course workloads of both the instructor and students.

Although Mike thought that CMC was an improvement over traditional correspondence-type homestudy models, it was still less effective than face-to-face instruction because it lacked immediacy, discouraged debate, inhibited thoughtful comment, and made misunderstandings difficult to rectify. He experienced more meaningful discussions when he taught in the classroom, in part because non-verbal cues of acceptance and tolerance could be communicated among participants even though they expressed significantly different points of view. He felt that more difficult or controversial areas could be explored more productively in the classroom because the instructor could focus the discussions, limit digressions, and correct fundamental misunderstandings of concepts or others' points of view when they occurred.

This view was contrary to most of the other instructors who noted that they experienced more open discussion on-line because the medium provided anonymity, students were able to carefully construct and revise their comments before submitting them to the conferences, and misunderstandings could be more easily highlighted and addressed in a textual medium like CMC.

Mike also found that dominant yet subtle social, political and economic ideologies that informed students' perceptions could not be challenged as easily in the on-line environment. The inability of computer conferences to facilitate a social type of adult education – that is, the transformation of understanding about these dominant perspectives and the consequent enablement of groups of learners to initiate socio-political change on a local level – was problematic. For him, the value of asynchronous, electronic student interaction was limited as a result.

Other instructors did not consider this to be a significant shortcoming of the medium. Randy, for instance, did not believe that he needed to challenge students' perspectives to be an effective educator. Rather, he thought that identification of expressed learner needs and acquisition and assessment of related, specific skills or competencies were more important instructor functions. In his view, it was inappropriate to assume that transformative learning was needed or desired by adult learners, or even if it was, to presume that adult educators could legitimately or successfully undertake the task. He stated,

> What is the goal of education? I don't think we know enough about [learners] to really address that question and so I would tend to say that unless we can define exactly what [transformative learning] is and I feel comfortable with trying to teach students that way, then I would tell the students that they should perhaps seek their "instruction" from someone else. If the students want to learn very specific skills, then I would be pleased to help them. That's not to say that I don't value these other things, it's just that I don't know how to deal with them. I can design an environment that gives students resources to be more self-directed learners. If you give them access to the Internet and other tools and teach them how to use the Internet, etc., then you've given them a tool that they perhaps use in being a life-long learner, for example. But to teach them [alternative perspectives associated with transformative learning] – I'm not so sure we know enough about it. (Int. 2, p. 16)

The value of individual student contributions to the computer conferences.

Perceptions also differed among the interviewed instructors about the value of student contributions to computer conferences. Some instructors considered the quality of interaction to be higher in computer conferences than traditional classroom settings because students were able to think, research, and spend more time on task as a group. John, Heather, and Alan, for instance, saw free-flow conversation as valuable, though they believed that interaction needed to take place in a structured environment to keep discussions focused and allow students to think more clearly about individual issues.

Other instructors were unsure about the educational value of student interactions. Doreen stated that though the ability of students to contribute to on-line discussions often had socio-emotional value or otherwise appealed to students, its usefulness as an instructional tool was limited. She felt that student-student interaction often exhibited characteristics of "the blind leading the blind" because she perceived student comments to be inaccurate or lacking content in many cases. More importantly, though, she felt that the learning outcomes associated with interaction were often neither definable nor measurable against specified learning outcomes.

Both Doreen and Mike noted that students "spoke" but did not appear to adequately "listen" or be willing to read more than brief comments on-line. This view was not generally shared by the other instructors, who noted that the quality of student comments was generally higher in the CMC environment than what they had experienced as classroom instructors or graduate students.

Frequency of student interactions. Several of the instructors commented about the comparative quantity of interactions among students in computer conferences compared to the traditional classroom. Alan and Heather felt that the frequency of on-line interaction was significantly greater in the electronic environment. Others like Mike felt that interaction was greater in the classroom. Some instructors saw computer conferences as encouraging otherwise shy students to participate because their voices could be more easily "heard" in the computer conference environment, and because physical or other personal characteristics that sometimes inhibited participation were absent or less-obvious. Alan noted more widespread participation in the computer conferences than classrooms, but attributed this to the voluntary suppression of "loud" voices: more-vocal participants could better control their impulses to immediately respond.

Some instructors did not find significant differences in the levels and patterns of student interactions between the on-line and classroom environments. Doreen and John noted that some students preferred to participate frequently, and others not at all. Most students preferred to sit back and observe before contributing. Doreen also found overall participation rates to be about the same, but noted that negative or positive effects on individual students could be obscured without more detailed study of this issue.

Conclusions about communicative processes. On the whole, the instructors expressed significantly different views about the value of group communication processes that occurred in the computer-mediated environment, the relative levels of student interactions that occurred in their conferences compared to their experiences in the classroom, and the educational value of individual student contributions.

Some instructors felt that CMC group communication processes were less valuable because the associated learning outcomes were undefinable, or less important. Others considered interaction to be essential for learning to occur, though within this group, there were some who thought that inherent limitations of CMC restricted its usefulness as an educational medium.

Some instructors criticized individual student contributions in general as being superficial and uninformed, or ignored by other participants. Other instructors, though, considered student postings to be valuable means of peer learning.

Several of these differences in experiences may be linked to how individual instructors teach. In the next section, various means used by instructors to facilitate learning in the CMC environment are discussed.

CMC Instructional Techniques

The instructors' descriptions of what they considered to be more important on-line instructional techniques have been grouped into the following areas: encouraging student participation, clarifying information, handling conflicts, compensating for the absence of non-verbal cues, summarizing and weaving practices, and pacing.

Encouraging student participation. The instructors held differing views about the appropriateness of encouraging student participation in the computer conferences. For instance, Randy and John preferred not to prompt students for input, while Heather, Doreen, and Alan actively encouraged students to participate.

Heather described a number of methods she used to encourage participation. She publicly encouraged students, supported and praised students when they did make contributions, and weaved and summarized conference contributions extensively. Alan also used a wide variety of techniques to encourage collaborative learning and sustain group interaction. An appropriately structured electronic learning environment was an important means to facilitate this, he believed. Databases in his courses were designed to involve students early and often in collaborative learning activities. He linked performance on assignments to demonstrated familiarity with the on-line discussions, and re-directed personal e-mail from students to the computer conferences. He was the only instructor who required submission of group assignments.

Some instructors observed that there were often tradeoffs when student participation was encouraged. Although John believed that interaction among students could create new knowledge, he was reluctant to draw non-participants into the computer conference discussions because he believed that students should be able to participate only if they wished to do so. In a broader sense, Randy noted that the introduction of new forms of technology like CMC could be viewed as enabling because these facilitated interaction among students. However, CMC also limited student participation in other ways because it erected barriers to access for potential students who did not have appropriate equipment.

Clarifying information. Mike thought that it was difficult to deal with misunderstandings and to clarify concepts in computer conferences because of time delays, the difficulty of following various conference threads, and the lack of visual feedback from students. Others, though, considered that misunderstandings occurred just as frequently in the face-to-face environment because visual cues of understanding and comprehension could still be mis-read.

In John's view, it was easier to resolve misunderstandings on-line. He could make more timely interventions because the interactions occurred less rapidly than in the classroom. Students also had a permanent record of instructors' clarifications. Other instructors noted that in many cases, the problem was self-correcting. Misunderstandings and confusion decreased as participants learned to refer to specific prior message numbers, or incorporate actual quotes from relevant postings.

Handling conflicts. In general, conflict was not common in the instructors' conferences. The instructors used various means to handle conflicts when these arose. Heather and Doreen preferred to send private e-mail to students in an attempt to decrease misunderstanding or bad feelings. Randy, John, and Mike tended to wait for students to intervene before attempting to resolve conflict. Alan stated that he encouraged minority views, and as a consequence appeared more tolerant of conflict within his courses.

Compensating for lack of non-verbal cues. Certain instructors found that the lack of non-verbal cues in the CMC environment changed their instructional practices and made interaction more difficult. John preferred to use non-verbal cues like physical proximity and eye contact to guide and facilitate interaction in the classroom. It was more difficult to encourage interaction and monitor engagement levels because of the absence of non-verbal cues and other physical manifestations that might indicate boredom on the part of some students, for example. Mike also noted that instructors were unable to assess problems with student comprehension due to the medium's lack of non-verbal cues. These instructors found that they could not adequately compensate for such limitations.

Alan, however, did not consider his instructional techniques to be essentially different from those he used in the classroom, despite the asynchronous nature of the CMC medium and consequent lack of non-verbal feedback. He stated that the techniques he used in the classroom to encourage discussion and draw out students were essentially the same.

Summarizing and Weaving Practices. The instructors also discussed their summarizing and weaving practices in the conferences. With experience, John stated that he preferred to be less-directly involved with the conferences and decreased his summarizing and weaving activities accordingly, primarily because of time constraints and personal cost and benefit considerations.

Randy as well did not consider it particularly important to summarize and weave conference contributions, but for a different reason. Since he considered the assignments to be the chief means for students to integrate course content with their personal experiences, he preferred to respond in the conferences to individual student comments rather than summarizing the discussions.

Mike stated that he tended not to summarize and weave conference discussions because the instructional material provided sufficient content and structure for the course, in his opinion, and because he believed that the personal value derived from interaction came primarily from the act of constructing contributions. Because Alan used group projects more extensively, he found that summarizing and weaving activities were more often carried out by the group members themselves.

On the other hand, Heather and Doreen took a more active role in weaving and summarizing conference topics, and spent a considerable amount of time assessing the quality of student contributions. Heather found that her weaving activities increased with experience, and viewed this as an important instructional technique.

Pacing. Several of the instructors talked about techniques they used to pace their students. Doreen and Randy deliberately controlled the pace and sequence of on-line discussions by withholding information about how to join the next conference or by suggesting that students move on to the next conference topic, for instance. This provided more coherence to the students' learning experiences, they felt. Heather allowed students to contribute to various conferences at any time to facilitate the varied personal needs of her students. However, she found that student progress through the conferences was still governed somewhat by group dynamics and the structured nature of the learning material. Both Heather and Alan provided additional instructional material as the course proceeded and as aids to dialogue. This practice governed student progress somewhat. Alan, John and Mike used deadlines for assignments as pacing techniques.

Conclusions about on-line instructional techniques. The instructors appeared to use different techniques to handle certain teaching situations. The techniques employed often appeared to depend on their views of the appropriate role of the instructor – in handling conflict, encouraging participation, and summarizing conference contributions, for instance.

Not all instructors viewed certain issues as problematic. For instance, some of the instructors did not find it difficult to clarify misunderstandings or compensate for the absence of non-verbal cues in the electronic environment. Other instructors, though, found that they could not develop appropriate alternate instructional techniques to counteract these perceived shortcomings.

The Effect of CMC on Instructional Practice

The instructors also discussed the effect of CMC on other aspects of their instructional practices. These were reflected chiefly in their views about the relative emphasis on printed instructional material, personal time management, and the effect of the electronic classroom on traditional instructor authority.

Emphasis on printed instructional material.

All of the instructors provided significant amounts of printed reading material. Most instructors provided these at the start of their courses, though Alan (and Heather to a lesser extent) provided electronic learning material at various stages of their courses. However, the relative importance attached to the instructional material and computer conferencing varied among the instructors.

Partly as a consequence, the number of computer conferences per course varied among the instructors. John, Randy, and Doreen each had four topic-specific conferences. Mike had seven instructor-led conferences and a small number of student-led conferences. Heather's course had 14 computer conferences, including student-led, small-group discussions. Alan used about ten group-based activities, but also required submission of group-based projects. Most of the other instructors preferred or allowed individually-submitted assignments. Some instructors like Doreen also included discussion questions in their conferences.

Impact of CMC on instructor's time management.

The instructors made several general points about the effects of CMC on the organization of their time. Many instructors found that significant amounts of time were needed to initially design and develop a CMC-based course. This was not offset by reduced instructional time once the on-line courses commenced.

Most of the instructors observed that though the asynchronous nature of the environment gave them time flexibility, the overall amount of time needed to effectively facilitate computer conferences and perform related administrative duties was significantly greater than in a classroom environment, primarily because increased levels of student participation lengthened the amount of time needed to read and respond to text-based messages. For instance, John considered the time demands of a CMC-based course to be two to three times higher than those of a conventional classroom course.

Time demands on the instructors were more onerous because assignments were more difficult to mark on-line, though various marking methods were employed. Some instructors sent electronic feedback about assignments to students; others provided feedback on printed assignments, which were then mailed to students. A few sent both e-mail summaries and more detailed written comments on the marked-up assignments. Several of the instructors continued to use the postal system or faxes to communicate with students about their assignments. However, the difficulties of navigating through various parts of the electronically-submitted assignments, maintaining an overall sense of structure, and inserting comments quickly were common complaints among the instructors. Though electronic feedback could be sent quickly to students, it took longer to produce this feedback. Most of the instructors noted that the continued conflict between marking demands and other professorial duties also impaired their abilities to provide what they considered to be timely feedback to students (usually seven to ten days). The potential of CMC to significantly reduce assignment turnaround time was limited by technological and workload constraints in most cases.

Further, all the instructors had at least one assignment in their course which gave students broad latitude in their chosen topic area. Consequently, marking time was substantially increased because of the unique nature of the assignments submitted and the individual consultation time that was required beforehand. In spite of this, the instructors did not plan to eliminate these individualized assignments because of the perceived educational benefits to the students.

To decrease their overall workload, some instructors were able to reduce their teaching duties in undergraduate homestudy courses. In other cases, class sizes were eventually lowered or course structures altered to reduce the frequency of instructor-student interactions. Most notably, Doreen found that she rapidly approached "burn out" in her initial CMC experience because of the significant amounts of interaction that she designed into her computer conferences. As a result, she significantly reduced her on-line participation in subsequent courses.

These views were not unanimous, however. Alan found that instructional time demands were not significantly different from those in the classroom. He also felt that the flexibility afforded by CMC counteracted any additional time demands because instructor responses could be slotted into a chosen daily routine, or performed in otherwise slack periods of the day.

Effect of CMC on traditional instructor authority. In common with some of the literature (Harasim and Johnson, 1986; Davie and Wells, 1991), Doreen, Alan and Heather felt that the computer conferencing environment seemed to naturally decrease the instructor's relative importance in the learning process. Authoritarian instructor-student relationships were replaced with more egalitarian ones. They found that students rather naturally assumed more responsibility for their own learning in the computer conference environment. However, Randy thought that this phenomenon resulted more from program philosophy and design than from any inherent attributes of computer conferencing.

John, though, disagreed that instructor-student relationships were more egalitarian in computer conferences. The textual nature of the medium and his inability to write in a "chatty" manner contributed to the perpetuation of formal, authoritarian relationships in the CMC learning environment, in his opinion. Mike also noted that students seemed to challenge his opinions less in the electronic environment, perhaps because the lack of non-verbal cues made it difficult for both the instructor and students to convey a sense of goodwill and acceptance while disagreeing with a stated position.

Conclusions About the Instructors' Accounts

The instructors' accounts varied significantly in the three categories of meaning described above – views of the communication processes used in the electronic environment, various instructional techniques employed, and the impact of CMC on instructional practices. The following section reflects on these variations, and suggests some underlying influences which may affect instructors' perspectives.

Reflections on the Findings

During the interview process, and later as I wrote and thought about the various instructors' stories, I was struck by the diversity of the CMC instructors' practices and perspectives. Some of the more notable of these have been discussed in the preceding sections. Although there were some experiences that appeared common to all the participants, many aspects of their computer conference experiences were unique, or shared by only one or two other instructors. Some experiences seemed to be markedly dissimilar and conflicting among the instructors.

I began to think more deeply about the nature of the differences in the instructors' accounts, and initially concluded that differences in instructors' perceptions of their computer conferencing experiences arose as a result of fundamental differences in educational philosophy and learning theory which informed their instructional practices.

As I explored this issue further, I identified other influences, such as students' different learning styles, differing levels of facilitative and technical skills, difficulties with the CMC software, patterns of discourse encouraged by CMC, and administrative issues that influence CMC use.

Some of the instructors' comments contributed to my initial perception. As John stated,

> Your belief system and your understanding of learning theory and where you're situated in the learning world in terms of your own philosophic presuppositions influences tremendously how you teach. The phenomenon [of teaching] is common but it has so many phenomenographic idiosyncrasies. Your theoretical perspective and your philosophic perspective have a tremendous impact on it. (Int. 2, p. 4)

Freire (1985) also believed that the practice of education could not be separated from the underlying philosophy of the practitioner. He stated, "All educational practice implies a theoretical stance on the educator's part. This stance implies – sometimes more, sometimes less explicitly – an interpretation of man and the world" (p. 43). Similarly, Pratt (1993) noted that there can be no value-neutral position with regard to adult learning and facilitation. In educational studies, he explained, "What too often has been missing is a clarification of underlying values and beliefs of the central concept of learning" (p. 22). Paulsen (1995a) noted that computer conference instructors also needed to identify their preferred pedagogical styles. He suggested that instructors "will perceive their role in educational computer conferencing in light of their basic theories and philosophies toward education" (p. 82). Ess (1996) also commented that "CMC theories rely on largely implicit philosophical assumptions" (p. 2). He did not specifically discuss philosophical underpinnings of CMC in terms of educational theory, but rather in terms of democratic participation and related communicative acts. However, his comments and those of other writers do speak to the importance of identifying and examining the assumptions and beliefs that often implicitly undergird experiences of the electronic learning environment.

The effects of different informing beliefs on the instructional experience do not appear to have been adequately addressed in much of the CMC literature. In the following section, a brief overview of certain relevant theories and their implications on the practice of adult, CMC-based education is provided, followed by an interpretation of the instructors' accounts in the context of these learning theories.

Four Theories of Adult Learning

Various writers (Brookfield, 1989; Ertmer and Newby, 1993; MacKeracher, 1996) described a total of four families of learning theories which appear relevant to this study – behaviourism, cognitivism (information-processing), constructivism (humanist), and dialectical (transformational or critical). They also suggested various assumptions on which these learning theories are based. Some of the writers discussed implications for instructional design and practice.

Brookfield (1989) stated that behaviourism favours competency-based adult education and assumes that the instructor holds the knowledge that learners are to acquire. Ertmer and Newby (1993) noted that behaviourism is primarily concerned with the reinforcement of desired responses through appropriate stimuli and feedback. The learner is characterized as being primarily reactive to the learning environment. Little or no attempt is made to assess mental processes as learning takes place.

Behaviourist instructional design prescribes observable and measurable outcomes in students, and requires that these be specified in advance. It also suggests pre- and post-assessment of learners' knowledge levels, mastery learning, and the use of practice and feedback to support or correct performance. However, as Winn (1990) noted, it makes "no attempt . . . to prescribe instructional strategies on the basis of a student's knowledge nor an assessment of which pedagogical processes are necessary for them to use" (p. 54).

Winn suggested that, similar to behaviourism, cognitivism emphasizes the role that environment plays in the facilitation of learning and also attempts to discover the most efficient and effective means to transfer knowledge to students. However, cognitivism also proposes that human behaviour is indeterminate. It therefore attempts to understand the more complex mental processing that occurs in the minds of learners when they think, solve problems, speak, and process information, for instance, and studies how information is received, stored, and retrieved by the mind. Instruction is focused not on behavioural procedures for manipulating instructional material, but on means to direct the thought processes of learners as they interact with material. He contended that the instructional design processes flowing from cognitive theory counter the reductionist tendencies of task analysis found in behaviourism (p. 53).

Ertmer and Newby (1993) suggested that cognitive instructional design differs from that informed by behaviourism because it attempts to make knowledge meaningful to learners through their active involvement – for example, by giving learners control of their learning and by assisting them with the development of self-planning skills. It also helps learners organize and relate new information to memory through the use of structuring and sequencing techniques to streamline information processing skills, and analogies and examples to create connections with previously-learned material.

Despite the differing behavioural and cognitive assumptions about what learning is and how it occurs, Ertmer and Newby noted that objectivist assumptions underlie both cognitive and behavioural theories of learning. Primarily, objectivism assumes that the world is real and external to the learner, and exists independently of individual awareness. The goal of instruction, therefore, is to communicate the structure of this external world to the learner.

Ertmer and Newby (1993) suggested that the third learning theory, constructivism, asserts that "the mind filters input from the world to produce its own unique reality" (p. 62). In other words, the mind creates meaning, rather than acquires it, and this meaning is created by communication, negotiation, and social construction. The philosophical underpinnings of constructivism were discussed in chapter 3.

As Willis (1995) noted, the goal of learning under constructivism is understanding within personally-meaningful contexts. From an instructional point of view, Ertmer and Newby (1993) suggested that knowledge under constructivist tenets is an internal representation of the mind, situation-specific and created, and results from the interaction of the learner with the environment. This internal representation is open to constant change, since many different meanings can be deduced from any experience and over time. Learning according to constructivist tenets is most effective when it occurs in realistic settings, and uses learning tasks that are relevant to the learners' lived experiences. Learning methods include coaching learners to achieve expert performance, presentation of multiple perspectives (through collaborative tasks, for instance), and negotiation of socially-constructed realities through discussion of personal experiences among the participants.

Despite the apparent incommensurability of objectivism and constructivism, Ertmer and Newby viewed instructional design attributes within these major theory groupings as part of a continuum, rather than as being discrete and mutually-exclusive. They noted that even though behavioural, cognitive and constructivist learning theories make differing assumptions about the nature of learning and how learning takes place, the theories at times prescribe the same instructional methods to support the learning process. The use of feedback is common to both behaviourism and cognitivism, for instance, as is the importance of learner and task analysis. Cognitivism and constructivism advocate the use of realistic learning tasks in meaningful contexts, and generally seek to involve the learner in this process. As Winn (1991) noted, this latter similarity occurs chiefly because both constructivism and cognitivism assume that the complexity of what has to be learned does not allow student behaviour to be predicted. This makes it more difficult to determine beforehand what will be considered acceptable performance. As a result, students develop their own learning strategies and often their own goals as well. Instructional strategies are needed which guide or coach learners when needed, but do not require learning to take place in a particular manner.

However, these theories do have significantly different practical implications as well. Ertmer and Newby concluded that constructivists view the learner as "more than just an active processor of information; the learner elaborates upon and interprets the given information" (p. 66). Winn (1990) noted that constructivism focuses on instructional systems that do not provide content so much as "shells [that] allow students to explore and to construct meaning for themselves" (p. 39). Though not explicitly noted, this would appear to include many forms of group-based asynchronous electronic communication. Pratt (1993) noted that the assumption of an objective reality underlying behaviourism and cognitivism – that the world exists independently of the learner and that to know something is to know its essence – means that the unobservable and unmeasurable learning supported by constructivism is "either inaccessible, untrustworthy, or insignificant. [If] the learner is active in constructing meaning and interpreting experience, knowledge and truth [are] compromised" (p. 16).

MacKeracher (1996) noted that the fourth model of learning – the dialectic – is primarily concerned with learning as transformation. Like cognitivism and constructivism, learners in a dialectical model are involved in active development of ideas through dialogue. Like constructivists, they endow themselves and the world around them with social meaning so that "both meanings and personal models of reality are changed during interactive and constitutive processes" (p. 232).

However, the learning experience should also be transformative. Mezirow (1983) termed this "learning for perspective transformation." He viewed perspective transformation as emancipatory learning that could free individuals from "libidinal, institutional or environmental forces which limit our options and rational control over our lives but have been taken for granted as beyond human control" (p. 5). He suggested that critical reflection is central to this process – a growing individual awareness of how various social, political, economic, and technological ideologies and the resulting sets of rules, roles, and social expectations, including assumedly-fixed power relationships and common wisdom, are assimilated in individuals. These create patterns of perception, thought, and action which he characterized as "false consciousness" (p. 8). False consciousness is transcended through adult education, which included an organized and sustained effort to enable adult learners to be self-directed in their learning activities. For effective and personally-significant learning to take place, learners need to be aware of the factors that constrain their ability to learn, including power relationships that flow imperceptibly (to the unenlightened) from ideologies imbedded in the social structure and cultural practices which significantly influence the learning environment (pp. 6-8, 18, 21).

Mezirow considered that the role of adult educators is to initiate perspective transformation by encouraging relevant group discussion, challenging psycho-cultural assumptions that emerge, and assisting learners in applying insights gained through discussion and debate to their own lives. In this role, the instructor is not value-free.

There have been various critiques of Mezirow's work and learning for perspective transformation in general. For instance, Merriam (1993) noted that it is unclear whether perspective transformation is limited to adulthood or whether it is a common occurrence among all learners. The specific cognitive and affective dimensions of the process are also unknown (p. 8). Still, the dialectical model informed by the writing of Mezirow and others has had a significant impact on some educators' views of the adult education process, including distance education.

The Relationships of Learning Theories to Instructors' Described Experiences

The described experiences of the six instructors seemed to be significantly related to personally-held views of learning. One group of instructors (Alan, Heather, John and Mike) appeared to hold views about the nature of the adult learning process which were essentially constructivist or dialectical in nature. They regarded the learning process as primarily an "among-learner" phenomenon[6] – that is, adult distance learners needed to be able to critically analyze instructional content and engage in dialogue with instructors and other learners in order to create individual meaning, validate their learning experience, and construct group-based knowledge even though separated by time and distance. A medium of interactive communication (CMC in this case) was therefore necessary for learning to occur.

As an example, Alan considered the accompanying reading material in his courses to be "triggers for learning" through dialogue, rather than a knowledge base to be absorbed by students through a variety of educational activities. He stated, "What I am focusing upon is the learner creating their own understanding, as opposed to being given this understanding and tested on it" (Int. 2, p. 2). Likewise, Heather took an active role in the computer conference discussions and looked for ways to share individual knowledge among students to facilitate group-based learning. John noted that students needed to actively and freely participate in the learning process through dialogue to create new, shared understandings.

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[6] The terms "among-learner" and "within-learner" used in this section to characterize two views of the learning process appeared in the ICDE95 conference "Interaction." See www.ualberta.ca/~tanderso/icde95/interaction_www.

Mike considered group discussion and dialogue to be essential to the adult education process because its chief purpose was to transform the learner, in his opinion. Computer conferencing was an indispensable part of his course because he felt that students at a distance needed to interact with each other and share life experiences to learn and initiate personally-meaningful change. The primary role of the instructor was to facilitate this dialogue and at the same time suggest to students how their educational experiences and daily lives could be unconsciously influenced by dominant, underlying socio-political perspectives.

As a result of viewing knowledge as essentially constructed and group-based, Alan, Heather, John and Mike tended to structure their computer conferences to encourage greater student participation. For instance, Alan and Heather had significant amounts of group-based learning activities in their courses. John assigned greater overall grade weight to conference participation to encourage dialogue. Alan and John re-directed private e-mail to the conferences to focus discussion within the group. Mike required students to set up and moderate their own conferences, and was supportive of increased student participation.

Alternatively, Randy and Doreen did not appear to view "among learner" interactions as either necessary or sufficient conditions for learning because they characterized learning as a fundamentally "within-learner" phenomenon. They appeared to subscribe to more behavioural and cognitive theories of adult learning. That is, while interactions among students or between instructors and students might be seen as desirable in some cases, and in certain instances improve the learning experience, they did not consider these interactions to be essential in order for more important forms of learning to take place. They also viewed independence as an important learner attribute and learner interaction with the printed materials and assignments as pre-eminent learning activities.

To Randy, adult education meant providing tools to students to make them more self-directed in their learning endeavours. He considered the assignments to be the primary means of learning in his courses. He was also reluctant to require group interaction if this meant that students would be unable to work individually on more personally-meaningful assignment topics. Like Doreen, Randy did not rely on group interaction to trigger the learning process within students because he considered it important to accommodate individual learning preferences as much as possible. For instance, he responded in kind to students who preferred to send him personal comments or questions via e-mail rather than posting to the conferences.

Doreen viewed computer conference interaction as a means of communication to be used as each instructor saw fit. Though she believed that interaction could provide social and emotional support for students at a distance, she questioned the instructional value of the learning outcomes associated with most types of student-student interactions because these could be neither defined in advance nor measured. As she stated,

> It's perfectly true that a whole raft of human learning occurs [through student-student interaction]. The point is, if you're a teacher and you're trying to ensure some kind of learning, you can't be sure who's learning what at any given time. And, in fact, what they learned can as easily be wrong as right. . . . When we deal with these non-prescribed kinds of learning outcomes, all I can really say is, "Gee, I'm really pleased that it happened." I don't know what to do when it doesn't happen, and I cannot take credit or blame if it occurs. (Int. 2, pp. 5, 6)

Doreen and Randy did not place as much importance on group interaction as the other four instructors. They appeared to consider that learning could take place through a wide variety of interactive and non-interactive media, and that individual learner exposure to structured material alone could be a valid, albeit independent, form of learning. They were supportive of individual learner preferences for independent study and one-to-one student contact with the instructor, and viewed these as often conflicting and outweighing the benefits of group learning.

As Doreen remarked,

> Several of the students in the first offering of [one of her courses] said, "I'm doing computer conferencing, and I'm enjoying it, and I actually like reading [the conference discussions], and it's really neat to be able to do it on my own time, but interacting with you is really all I need. I didn't need the [computer conferencing] particularly." (Int. 1, p. 11)

For these instructors, a major function of the computer conferences was to improve the quality of individually-submitted assignments. As a result, alternate communication media (e.g., private e-mail, fax, telephone) were used more often than the computer conferences by these instructors to provide support and instruction to students. Computer conference participation was not significantly rewarded by them.

Based on the preceding analysis of the instructors' accounts, it appears that variations in underlying educational perspectives significantly inform instructional practice and, as a consequence, the instructors' experiences of the CMC medium. Different, even conflicting instructional practices may be considered appropriate when considered from the perspective of the informing learning theory. The link between instructional perspective and the practices of CMC instructors appears to warrant further study in the literature.

The instructors' accounts also revealed other influences which could affect their instructional experiences – for example, individual student learning styles. These are discussed below.

Impact of Students' Learning Styles on Instructional Practice

Perhaps the best known adult learning model is that proposed by Kolb (1984), whose experiential learning cycle includes concrete experience, reflective observation, abstract conceptualization, and active experimentation. Learners, he proposed, start at different places in this cycle and move through its various stages throughout the learning process. Depending on where the learner is situated in the cycle, Kolb proposed four learning styles – accomodator, diverger, assimilator, and converger. He suggested that while learners can and should use other styles, they tend to begin with their preferred style and to use other styles less frequently and less productively.

MacKeracher (1996) also noted that adult learners will likely exhibit significant differences in learning needs and preferences. She described characteristics of learners based on Kolb's four learning styles, noting that assimilators seek to begin "by reading about the topic," divergers "like to begin by talking things over with others 'to get the big picture'," accomodators preferred to begin by "doing an activity," while convergers "define the learning task and set clear goals." (p. 211).

Some of the instructors also tried to accommodate students at different points in their learning cycles by providing varied types of learning experiences. For instance, Doreen encouraged both many-to-many and one-to-one communication, as she recognized that students desired group interaction at certain times, and preferred to interact solely with the instructor or the learning materials at other times. She summarized and weaved various conference contributions as learning aids for some students in an attempt to spur interaction. She felt that this met some of the socio-emotional needs of her students as well as aiding cognition at times. On the other hand, and like Randy, she also interacted with students individually by e-mail, telephone, or fax if they desired, and used fairly specific learning objectives and goals in her course design.

However, the defining characteristics of the CMC environment – asynchronous, text-based communication – prevented individual student needs and preferences from being fully accommodated in some instructors' views. Mike believed that on-line group interaction was limited because the computer conferences did not provide the same rich learning experiences as face-to-face interaction. Though he considered CMC-based learning to be superior to the correspondence-based, telephone-supported distance education model characteristic of Access University undergraduate programs, CMC still limited the instructor's ability to not only use alternative learning strategies, but also to ascertain student learning needs because it lacked non-verbal cues and the immediacy of dialogue. Like most of the instructors, his attempts at providing alternative learning experiences were also limited by personal time constraints. This in turn was exacerbated by the need for textual rather than spoken responses to students.

Some attempts at providing alternate means of learning were only partially successful. Heather, like many of the instructors, had not been able to design effective group-based assignments which she believed would enhance the learning process for some students. She took many steps in the initial weeks to develop individual student profiles and encourage conference participation, but also recognized that in spite of this, some students would just not make postings.

The Influence of Instructors' Relative Instructional Abilities

The accounts in this study may differ in part because some of the instructors are more capable, energetic, experienced, or possess more appropriate skills for teaching on-line. As Kaye (1989) noted, individual differences in computer and related skills among CMC instructors affect their perceptions of the usefulness of the medium (p. 15). For instance, Mike described a rather cyclical process he experienced. He noted that he was not an enthusiastic computer user in part because he tended to forget lessons learned from previous on-line courses. However, he forgot these lessons primarily because he did not want to use computers regularly. The greater summarizing and weaving activities performed by some instructors also may be a function of their innate abilities in this regard, and their willingness to invest the time that the practice requires. This activity could in turn improve or at least change the dynamics of on-line discussions and the instructors' resultant experiences. Finally, four of the instructors used one of the earlier versions of a computer conferencing software system at the time of the interviews, while two used one of the most sophisticated systems available. The relative amount of time required to become proficient on a particular conferencing system may have deterred some instructors from developing their on-line instructional skills as extensively as others. All of these factors could contribute to the instructors' somewhat different experiences of the CMC medium.

The Pattern of Discourse in CMC

The discursive nature of electronic interaction may also have affected some instructors' experiences of the CMC medium more than others. Kolb (1996) described the rhythm of e-mail as having

> more of the feel and style of oral communication. E-mail messages are typically rapid and short. Topics get developed in several exchanges of shorter messages rather than in one exchange of long position statements. The liveliness of e-mail comes from this rhythm of communication. I do not have to work out my ideas in advance to the last detail, because you will ask questions and I will clarify as we go along. (pp. 15-16)

He also pointed out that the argument patterns of conversations are affected by the technology. He stated,

> Discussions by e-mail often branch off without ever returning to bring the contributions or conclusions of the branched discussions into contact with earlier questions and earlier stages of the discussion. . . . E-mail encourages interruption; threads of discussion mutate and branch. (p. 17)

This rhythm tends to encourage some types of discussion and discourage others. Participants list points rather than develop full arguments, and provide brief rebuttals to equally brief quotes from previous messages.

Similarly, several of the instructors in this study were frustrated with the brevity and superficiality of many of the students' comments. They found that students did not debate ideas or raise arguments as readily or as fully as they did in classroom settings.

As Mike in particular noted, technology changed interaction patterns. Arguments were harder to sustain because tangential postings intervened and clouded the discussion. This phenomenon made effective instruction more difficult than in the classroom. Doreen also questioned whether electronic messages really formed conversations or merely resulted in participants talking past each other, and as a result whether the process of posting comments could be considered genuine interaction.

Heather had been disappointed by the lack of minority opinions in students' comments, and their often unreflective nature in general. Though she had observed that students took more responsibility for their learning as the course progressed – by asking probing questions, for instance – she concluded that students tended to resist deeper analysis of issues unless encouraged to do so. In an attempt to overcome this tendency, she tried to introduce topical material into the conversations and wove links between the postings within the various groups.

The sheer volume of interactions also affected instructional practice in some cases. Initially Doreen was overwhelmed by the extent of conference participation and eventually limited her use of introductory questions to reduce the number of ensuing messages to a manageable level for all participants.

These somewhat negative characteristics of the current state of electronic discourse suggest the need for newer technologies which are better able to focus discussion and encourage deeper analysis. As Kolb (1996) noted, new hypertext capabilities and navigation aids in asynchronous communication technologies are needed to provide more appropriately-linked discussions and allow for spontaneous and useful digression, yet help participants maintain the thread of linear arguments. In the absence of these new technologies and without new understandings of the dynamics of CMC interaction, practitioners may need to examine and downgrade their expectations of computer conference conversations.

To this point, only the effects of "educational" influences on CMC instructional practices have been discussed – the impact of personally-held views about learning by instructors, varied learning style preferences of students, relative instructor competencies, and the discursive nature of asynchronous electronic communication. However, larger organizational influences may also affect instructors' experiences.

The Effect of Distance Learning Organizational Structure on Instructors' Experiences

Some writers have stated that organizational issues significantly inform understanding of a wide variety of adult distance education processes. Peters (1993), while acknowledging the fundamental importance of learning theory to the development of distance education practice, criticized studies that merely focused on instructional and learning issues. More research effort needed to be directed toward understanding the unique organizational characteristics of dedicated distance education institutions[7] since these defined the distance education phenomenon, in his opinion (pp. 133-144). Ljoså (1993) also noted that an examination of both organizational and pedagogical issues was necessary to provide a more complete perspective on adult distance education research.

In this section, two such organizational influences on distance education teaching and learning experiences are discussed. First, the effects of organizationally-entrenched learning theories on distance education text production processes are described. Second, possible limitations are examined which may be imposed by cost structures characteristic of dedicated distance education institutions.

Effects of entrenched learning theories. Evans and Nation (1989) argued that the distinct organizational characteristics of dedicated distance education institutions are often undergirded by dominant, unstated learning theories, and that these may be antithetical to good adult education practices. They applied the Mezirow (1983) critique of adult education to distance-based learning models, agreeing with him that the primary goals of adult learning should be to increase the capacity for self-directedness in the learner and to transform perspective.

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[7] Dedicated distance education institutions are defined as those having separate governing structures,

In the view of Evans and Nation, these goals required the explicit engagement of learners in shaping their own learning experiences and the collaborative sharing of educational experiences between teacher and student, including joint participation in the evolution of curriculum and educational practice as it applied to each student (p. 10). However, they suggested that the traditional authoritative role of the teacher in the educational process created a power imbalance which tended to stifle critical reflection in learners. In distance education, this imbalance was principally created through instructional practices informed by behavioural learning theory. Behaviouralism resulted in practices which objectified student and teacher in the distance education environment and turned students into passive receptors of information (pp. 244-45).

The processes of "text production" (for instance, the development of highly-structured printed and audio-visual learning material) in dedicated distance education institutions were particularly problematic, because these

> are shaped by the structural properties of those texts. In this way the language, rules, codes and means of interpretation embedded in particular textual forms shape the ways distance teachers engage in producing their text. The knowledge production of distance education is shaped and mediated by and through the forms of text production which constitute distance educational practice. (p. 245)

These inherent properties of text production, they argued, profoundly affect the nature of relationships among students, their teachers, and the learning organization because distance educators can more easily choose and shape the knowledge base required of students, and regulate the form and substance of student discourse. Students

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including chief executive officers, and where education is predominantly transacted at a distance.

have little option but to conform, since the distinctive knowledge production processes and imposed learning structures characterized by this instructional industrialization confine students to "a system of learning which reflects and aids the reproduction of the ideological and structural conditions of society" (p. 249). As a result, they suggested, the distance learning organization tends to dominate and alienate students. This makes the perceived "good" practices of face-to-face adult education difficult or impossible to accomplish – in particular those concerned with transformative learning and education for greater democratic participation – because instructional industrialism fails to treat adult learners as autonomous, self-directed and self-motivated.

As Spencer (1997) noted, continued reliance on structured learning material, even in CMC-based programs, may perpetuate dominant political, social, and economic perspectives. He stated that

> the internal [institutional] obsession with technologically advanced delivery systems and carefully structured knowledge . . . will work against the more creative symbiosis of knowledge and experience which is needed for social purpose education. The concentration on technology can mask the way education is being used to achieve student conformity and adaptation to dominant ideology. (p. 6)

Thus, he argued, adult distance educators must "come to terms with the structural constraints of [dedicated] distance education institutions" (p. 9) which can apply in both traditional, print-based, correspondence forms of distance education, and newer electronic mediums like CMC. Both may rely significantly on the text production processes critiqued by Evans and Nation (1989). Distance educators, Spencer contended, needed to employ particular group-based communication techniques in computer conferencing and use other forms of computer-mediated communication more creatively to recapture the essence of adult education missing in most forms of distance education to date – primarily through the use of formal and informal student-student dialogue and group work. Otherwise, text could continue to limit the effectiveness of CMC-based courses.

Some of these limitations were described by the instructors in this study. John, for instance, specifically noted that the textual nature of the CMC medium contributed to the perpetuation of formal authoritarian relationships between instructors and students, in his opinion. Several of the instructors also discussed the difficulty in motivating students to interact spontaneously. In the final analysis, many of these problems may result from limitations imposed by a reliance on text to both communicate instructional material and transact asynchronous, electronic interactions in distance education organizations.

However, the development of alternative instructional systems like CMC and ultimately the experiences of students and instructors in this environment may also be influenced by the distinctive cost structures of dedicated distance education institutions. These influences are considered in the following section.

The economic implications of CMC. Nipper (1989) described dedicated distance education institutions as progressing through three distinct phases of change or "generations" – a) study by mail; b) the use of print, audio-visual or broadcast media, supplemented by limited telephone tutor support; and c) the use of interactive technologies like videoconferencing or CMC to provide more interaction among learners, and between learners and instructors.

Despite this evolutionary process, other writers like Peters (1983) suggested that many dedicated distance education institutions remain fundamentally "industrial" in orientation. Peters considered the traditional classroom to be a pre-industrial form of education where the instructor is the centre of the educational process and is responsible for most of the learning activities and outcomes, much like an artisan or master craftsman. On the other hand, he claimed, distance education had responded more readily than other forms of higher education to the historical, social, and political forces that shaped modern society. As a consequence, dedicated distance education institutions represent the industrialization of teaching and learning because they allow knowledge to be turned into a mass-produced, affordable, and widely-available commodity (p. 110).

Keegan (1994) also believed that the changes to higher education created by the industrialization process were fundamentally similar to those that were observed in modern society as a whole. Elitism had given way to egalitarianism, or at least the technical and administrative preconditions for universal access to higher education were put in place; individuals had assumed more authority and become more independent and responsible for their actions (though he acknowledged that overt or sublimated, repressive power might still exist in various forms); interpersonal relationships had become more remote and anonymous because of mediating effects of technology; and the production (education) process no longer relied on a special person nor took place in a special place or at a special time.[8]

Peters (1983) suggested that dedicated distance education institutions generally use industrialized production processes that represent a more complex confluence of logistics, organization, and educational issues than conventional educational organizations. In order for instructors' knowledge and skills to be transmitted in a cost-effective manner to a much larger number of students, for instance, these institutions need to mass-produce standardized, carefully-structured instructional media, and differentiate course development, production, and instructional labour processes. Keegan (1986) summarized the characteristics of industrialized education proposed by Peters as:

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[8] However, Keegan (1990) noted that Peters did not necessarily advocate this process of instructional industrialization, as he considered it unnatural. It breaks the normal communication patterns between instructor and learner and requires the substitution of mechanical forms of interpersonal communication, for instance. These factors necessarily change the nature of instructor-student interaction and increase the possibility of learner alienation (p. 80).

1. *Rationalization*, whereby knowledge and skills are transmitted by one instructor to a much larger number of students than in traditional classroom instruction, through the use of detailed, printed instructional materials, for instance;

2. *Standardization* of learning material as a result of formalized production processes. Students receive the same material in a particular course, which may consist of a purchased textbook, a collection of readings, or other course content written by a subject matter expert, accompanied by a study guide and assignments;

3. *Mass production* of large amounts of this standardized printed material for use over long periods of time;

4. *Division of labour* and *assembly line* features. Duties that would normally be performed by one classroom instructor are distributed among several members or units within the distance education organization. For instance, teaching material might pass through the hands of instructional designers, subject-matter experts, editors, graphic designers, and printers as it is developed;

5. *Mechanization* of the traditional classroom teaching process, whereby technology (mainly related to production of print and audio-visual materials) supplants the predominantly verbal instructional techniques of face-to-face instruction;

6. *Objectification of the teaching process* because teaching tasks are made more rigid and predictable;

7. *Increased planning and preparation*, particularly in administrative and financial areas, because the distance learning production process is more complex and requires investment in the necessary technology;

8. *Monopolization* of distance education, or at least concentration of responsibility for the provision of various levels of distance education in the hands of one provider by the state (pp. 76-77).

However, Peters framework was criticized by various writers including Rumble (1995). Rumble stated that not all distance education institutions exhibited the industrialized features proposed by Peters, that the practice of distance education did not differ markedly from the craft of traditional education in many institutions, and that the industrialized features of education were not necessarily limited to distance education, particularly with the advent of electronic technology.

Peters (1996) responded to Rumble, considering him to be "profoundly wrong" because he focused too narrowly on the actual production processes of distance education institutions. Peters reiterated that university distance education in its most important forms continued to be characterized by highly industrialized, technically-mediated processes while conventional education in essence remained orally-based. Technology significantly differentiated the various teaching and learning processes that were carried out in dedicated distance education institutions.

Further, although conventional universities continue to rationalize their teaching processes in order to cope with mass education and resource limitations (and produce forms of isolation and alienation in many ways characteristic of those experienced by distance learners in the process), this did not evidence the industrialization of conventional educational institutions in Peters' view. In comparison, distance education remained comparatively better planned, developed, implemented and evaluated, and relied significantly on mediating technology – the more important hallmarks of industrialized education.

Campion (1996) argued that Peters' work provided a useful starting point for the analysis of dedicated distance education institutions, as these institutions continued to evolve much like organizations in other industries in Western society. In Campion's view, the Rumble critique of industrialized education as being similar to conventional education, using as an example the highly bureaucratized, large-scale structure of the

British Open University, ignored the more useful study of distance education institutions which exhibited more flexible and democratic structures. These institutions were consequently more attendant to the evolving needs of students, could increasingly provide high-quality, lower cost distance education to more and more students, and would produce distinctively new forms of organizational structures. He noted that

> with the use of cheaper, more user friendly and flexible computing, communication, and print, together with new technologies which could be developed through participation, a very different type of distance education network can be envisaged: one which is more decentralised, democratic, participatory, open, and flexible. (p. 60)

Campion's description appears to specifically include CMC-based learning systems. It remains to be seen, though, whether these asynchronous, electronic forms of distance education will maintain one of the primary advantages of industrialized distance education proposed by Peters – its cost effectiveness.

The introduction of CMC-based graduate programs at Access University appears to have significantly affected several aspects of the industrialized education process. First, the learning model has been altered to encourage greater dialogue between instructors and students.[9] Most of the instructors in this study noted that they now assume a greater presence in their CMC-based courses, similar to their classroom experiences. Second, development and instructional duties are now more often concentrated in the hands of individual CMC instructors. In general, the instructors reported that they were involved in a wide variety of educational activities in the graduate-level CMC environment, including material development, moderation of computer conferences, student assessment, and provision of individual support and feedback to students.

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[9] Though as discussed earlier in this study, significant variations in individual instructor practices and informing learning theory exist.

These experiences are different from these same instructors' experiences of more traditional correspondence-based undergraduate programs at Access University where, in general, printed materials are a more significant source of instruction, tutor support in practice is often incidental rather than integral to the instructional model, opportunities for interaction are less frequent, average numbers of students handled by each instructor are larger, instructional and administrative duties are often divided among course coordinators, tutors, markers, and telephone attendants, and students are viewed more as individual learners than as part of an electronic class.

The tendency of the CMC-based M.Ed. and M.Comm. programs to de-emphasize division of duties, reduce average numbers of students per instructor, increase levels of instructor-student interactions, and create electronic cohorts of students suggests that the introduction of CMC may in fact "deindustrialize" the distance education process.[10] According to Peters' model, and other factors being equal, this deindustrialization could be expected to increase instructional costs.

In the case of both classroom- and distance-based graduate programs, increased interaction is generally recognized as a desirable goal. The incurrence of additional costs to accommodate this interaction is accepted as reasonable. At Access University, the graduate programs have been able to adopt this deindustrialized model for several reasons. First, they finance some or all of their respective program costs by charging higher tuition fees than undergraduate programs. In the case of the M.Comm. program, the tuition fees are completely market-based.

Second, these programs had greater budget flexibility at their inception. For instance, the M.Ed. program is administered and staffed primarily by faculty from the

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[10] Though arguably less so in the M.Comm. program, where there is greater division of duties and larger cohorts of students per instructor.

Department of Education Studies, which is allocated a proportion of the University's annual operating budget. Prior to the inception of the M.Ed. program, the mandate of the Department of Education Studies was to conduct research on institution-wide distance education issues. This mandate was changed, and permanent faculty positions were made available to develop, instruct and administer many of the courses in the M.Ed. program without incurring significant new costs. Similarly, the M.Comm. program is staffed by seconded or contracted faculty members. In the initial years of operation, seconded staff salaries were subsidized by their home faculties. Contracted instructors continue to be paid only for the duration of their courses, and are not required to perform research or administrative duties. As a consequence, the per-student instructional costs of M.Comm. faculty are reduced.

Third, both the M.Ed. and M.Comm. programs adopted CMC-based learning platforms from their inception. Students were expected to provide their own computer hardware and telecommunications, which significantly reduced instructional costs.

On the other hand, undergraduate programs at Access University appear to be constrained from developing similar CMC-based learning models for several reasons. Enrollment levels in relatively large print-based, telephone supported homestudy programs need to be maintained in order to ensure stable government funding levels for the institution as a whole. Instructional materials therefore need to be developed to service both print-based and CMC-based courses, and these may be dissimilar if the underlying learning models are different. Minimum computer requirements for undergraduate students are difficult to establish because of the University's mandated open access policies for these programs. Undergraduate tuition fee increases are limited by government fiat and Access University policy, and differential fees for new forms of technologically-enhanced courses and programs are not permitted. In addition, while funds were provided to pilot CMC-based learning system innovations at the undergraduate level, these primarily covered initial capital costs, and not ongoing operating expenses. Government operating grant reductions that were phased in commencing April 1, 1994 made it even more difficult to reallocate financial resources from established print-based programs to new CMC-based programs.

As a result, the somewhat distinctive organizational features of the M.Ed. and M.Comm programs at Access University not only allow more extensive interaction to be incorporated into their CMC learning models, but also provide the economic wherewithal for this. The level of instructor-student interaction made possible by rather unique economic and organizational factors has significantly determined the way in which the M.Ed. and M.Comm. programs have been designed and conducted, and hence the instructional experiences of this study's participants.

However, the design of undergraduate CMC-based learning systems at Access University and similar dedicated distance education institutions will have to be structured differently to provide increased interaction. Otherwise, increased financial costs may make the transition to CMC-based learning systems economically unjustifiable.

Learning models that provide increased interaction for students without significantly increasing instructor involvement need to be explored – for instance, the use of chat rooms and student-moderated computer conferences. Web pages and frequently asked question databases may provide cost-effective means to improve information flow to students. With experience, and similar to the accounts of some of the participants in this study, instructors may be able to intervene more strategically, or encourage more student-initiated and student-maintained dialogue, thereby accommodating both increased numbers of students and increased levels of interaction. Attention to new ways to divide duties in the on-line distance education environment – for instance, the use of Help Desk attendants to handle e-mail and telephone queries regarding routine and repetitive administrative matters – and more research focused on when and why students access course facilitators could also result in more effective use of instructors' time.

Finally, learning models which provide increased levels of interaction should only be introduced in educational settings where warranted – for example, as Peters (1996) argued, when interactions among students and instructors are more frequent and are necessary to communicate social norms and "intersubjectively-shared everyday language," or when these interactions have as their goal the emancipation and individualization of the participants (p. 52).

Conclusions about the effects of organizational factors on instructional experience. CMC instructional experiences in dedicated distance education institutions may not only be informed by instructors' personal views about the nature and purposes of the distance and adult education processes, by individual learner needs, and by differing instructor skill sets, as suggested earlier, but also by organizational factors.

First, inherent structural properties of both print-based instructional material and text-based electronic instructional systems like CMC may still perpetuate dominant learning theories and objectify the learning experience, thereby affecting the relationships among students, instructors, and the learning organization and influencing how individuals perceive their distance education experiences. Second, the distinctive organizational and financial characteristics of the M.Ed. and M.Comm. programs at Access University have allowed CMC-based learning models to be developed in these programs which may be rather unique, and thus uniquely affect instructional experience within them. These CMC-based systems likely provide a higher level of interaction between instructors and students than can be expected from similar systems that may eventually be adopted on a large scale in the undergraduate programs because CMC appears to deindustrialize the distance education process and make it less cost-effective. Significant evolution away from an industrialized, second generation (print-based, telephone supported) distance education model to third generation models which provide increased interaction between learners and instructors may be impeded by increased financial costs, unless alternative models are developed.

These models will likely need to provide larger numbers of on-line information sources for students, and support more unstructured, fluid and direct student-to-student interactions compared to the more formalized, ongoing, instructor-moderated interactions often found in computer conferencing environments at present. Traditional on-line instructional duties and practices also need to be re-examined to use instructor resources more effectively.

As dedicated distance education institutions proceed into the 21st century, they will need to come to terms with these organizational issues in order to successfully evolve into full-scale next-generation distance education providers.

Summary and Conclusions

Aspects of the instructors' experiences described in this study that were particularly noteworthy to me were discussed in the first part of this chapter. These were grouped into three broad categories of meaning. The first grouping dealt with instructors' perceptions of CMC communication processes – the usefulness of group interactions, and the frequency and value of individual student contributions. The second grouping described specific CMC instructional techniques used by the instructors – those used to encourage student interaction, clarify information, handle conflict, compensate for the absence of non-verbal cues in the asynchronous environment, summarize and weave conference contributions, and pace learners. The last grouping described the effect of

CMC on instructional practice – in particular, the use of printed instructional material, instructors' time management processes, and instructor authority.

Areas of significant agreement and disagreement were identified within each area. The instructors had different perspectives about the relative role of written instructional material, whether and how to encourage student participation, and the extent, value, and authenticity of on-line student interactions. They differed with regard to perceptions of instructional time demands in the asynchronous environment, the relative difficulty in handling misunderstandings and compensating for the lack of non-verbal cues, and whether the instructor's traditional authority was limited by CMC processes.

Further reflection on some of these differences suggested that fundamentally different educational philosophies of the instructors significantly affected their practices in, and experiences of, the CMC environment. Two instructors appeared to support behavioural or cognitive (objectivist) learning theories and considered learning to be more of a "within-learner" process. This view fundamentally assumes that knowledge is acquired by individual learners through interaction with an objective, external reality that exists independently of individual awareness. These instructors tended to emphasize learner needs of independence and self-directedness. They designed and followed fairly specific learning objectives, considered printed instructional material and individually-submitted assignments to be the pre-eminent means of learning, and viewed understanding of specified course content as the most important learning outcome. Computer conferencing tended to be viewed as an optional communication tool or a means to accomplish less-emphasized learning objectives and not as a integral part of the learning process. The value of computer conference interactions were difficult for them to assess because these were not easily measured and could not be correlated with pre-determined learning outcomes. They de-emphasized computer conference participation by assigning less grade weight to this activity and used alternate means of one-to-one communication (telephone, fax, e-mail) when these types of communication were desired by learners.

The other four instructors tended to view learning more as an "among-learner" process, informed by the constructivist paradigm. Here, reality and truth are subjectively perceived. Knowledge is viewed as an internal representation of the mind, and based on interpretation of experience. The creation of knowledge occurs as a result of essentially subjective transactions among two or more human beings, and is validated by social consensus within limited contexts.

A central goal of these four instructors was to provide collaborative, group-based learning experiences to facilitate knowledge construction among learners. They saw interdependence and collaboration as more important learner needs. This required CMC-based interaction, and they encouraged computer conference activity by assigning relatively more grade weight to this activity, and in some cases taking a more active role in the discussions.

The practical implications of apparent differences in theoretical perspectives that inform both instructors' experiences in this study and the literature in general do not appear to have been sufficiently explored by other writers. Divergent yet equally defensible views about appropriate CMC instructional practices may be entertained if these underlying theoretical perspectives are taken into account.

However, other influences also appeared to affect instructors' experiences. Learner needs and preferences need to be respected, for instance. In some cases, time restrictions did not allow the instructors to implement what they considered to be good instructional practice, like group-based assignments. Differences in individual instructors' teaching aptitudes and technical proficiencies, and the relative ease of use and capabilities of the two conferencing systems used by the instructors could also have affected their experiences.

Certain attributes of the asynchronous electronic environment – for example, the discursive nature of asynchronous electronic interactions – detracted from the otherwise positive experiences of some of the CMC instructors. The lack of non-verbal cues was also problematic for some of the study's participants, as this hindered group communication processes and learner engagement. These factors also inhibited perspective transformation which was seen as the pre-eminent goal of adult education in one instructor's opinion.

Larger organizational issues could also affect CMC experiences. First, dominant behavioural learning theories imbedded in the text production processes of traditional distance education universities can continue to influence how newer forms of learning systems like CMC are developed and used. Second, despite the potential for increased interaction that CMC offers to distance learners, learning models adopted by the M.Ed. and M.Comm. programs at Access University appear to deindustrialize the instructional process and make these programs relatively more expensive to run. The costs of providing increased interaction may affect when and how distance-based universities incorporate computer-mediated learning environments, particularly in undergraduate programs where ongoing tutorial support for both electronic and traditional distance education students must continue, tuition fees cannot be increased significantly, and higher student-instructor ratios must be maintained to contain instructional costs. As a result, the experiences of the instructors in this study may be somewhat unique.

As dedicated distance education institutions proceed into the next millennium, they will increasingly need to convert second-generation (print-based) learning systems to third-generation electronic forms, including CMC. Because increased instructor-student interaction in these CMC-based graduate programs appear to result in increased costs, alternate learning models need to be developed which support more unstructured and student-initiated interaction, enable instructors to monitor learning activities and intervene more strategically, and generally provide increased amounts of student support without requiring additional amounts of instructor time.

Chapter 6

SUMMARY OF THE STUDY, REFLECTIONS, AND IMPLICATIONS

This final chapter summarizes the nature of the study, the major research question, several important issues arising from the review of the literature, the method of enquiry used, major findings, and the implications of these findings for the organization and practice of distance education. Personal lessons learned as a result of this study and recommendations for future research are also included.

Summary of the Study

The study undertook a probing examination of the instructional experiences of six CMC instructors in two graduate-level programs at Access University, a dedicated post-secondary distance education institution. A constructivist paradigm was assumed. Naturalistic enquiry was used to explore aspects of the CMC instructional experience that the participants considered personally meaningful and to identify emergent themes.

The research question for the study was, "What are the experiences of instructors in CMC learning environments?" Some preliminary, guiding questions were developed prior to the interviews about the participants' views of themselves as instructors, of their students, and of the CMC educational process. Additional, important areas of interest arose from the instructors' own descriptions and from my interpretation of their accounts.

Several issues arose from the literature review. On a practical level, there appeared to be somewhat conflicting views about the nature and relative advantages of CMC as an educational medium as well as what constituted appropriate CMC instructional practice. Researchers also appeared to hold different, usually unstated perspectives about relevant learning theory underlying their studies. Some writers tended to characterize CMC instruction as a means to develop various competencies or higher-order cognitive skills; others viewed it as a means to promote knowledge construction within learning groups, self-directed learning, or transformation of learner perspective. These views could influence the way CMC is experienced, described and investigated.

Two in-depth, unstructured interviews were conducted with each of the study's six participants between April and August, 1996. The instructors taught in one of two graduate programs at Access University. Both programs are CMC-based. All the study's instructors had taught in this environment during the preceding two years.

Each instructor's account was described in detail in chapter 4. These accounts were then analyzed in chapter 5. The instructors' experiences were divided into three broad areas of meaning. The first area discussed instructors' perceptions of the educational value of CMC communication processes – specifically, the usefulness of group interactions, and the frequency and value of individual student contributions. The second area compared and contrasted various instructional techniques used by the instructors in the CMC environment to encourage student participation, clarify information, handle conflicts, compensate for the lack of non-verbal cues, summarize and weave conference postings, and control the pace of student progress through the on-line courses. The final area summarized the instructors' views about the effects of CMC on instructional practice – in particular course design, time management, and traditional instructor authority.

As I initially reflected on the accounts, it appeared that different educational philosophies significantly affected individual instructor practices in, and experiences of, the CMC environment. Two instructors' experiences appeared to be informed by behavioural or cognitive learning theories. Learning seemed to be viewed as essentially a "within-learner" phenomenon. These instructors designed and followed fairly structured learning objectives and stressed the importance of printed instructional material and written assignments in the learning process. They de-emphasized computer conference participation by assigning less grade weight to this activity, frequently used alternate, one-to-one forms of communication (telephone, fax, and e-mail), and employed fewer collaborative learning activities than the other instructors.

The other four instructors' practices and experiences appeared to be informed by constructivist learning theory. They viewed learning more as an "among-learner" process – a series of essentially subjective educational transactions among two or more human beings, validated by social consensus within limited contexts. These instructors provided (or desired to provide) relatively more collaborative, group-based learning experiences to facilitate the knowledge construction process among learners. They emphasized the role of computer conferencing in their courses by assigning relatively more grade weight to this activity, and redirecting private e-mail from the students to the conferences, for instance.

However, various factors also moderated actual instructional practice like respect for differing learner needs and learning styles, instructors' personal time constraints, and varying levels of instructional expertise and technical competence. For some instructors, the limitations of asynchronous electronic interaction – for instance, the lack of non-verbal cues, response delays, and the discursive nature of the medium – also hindered the educational effectiveness of CMC. It appears that diverse yet equally defensible views about appropriate CMC instructional practices can be entertained if these underlying perspectives and moderating influences are taken into account.

Finally, two larger organizational issues which may affect instructional experiences were discussed. These also have implications for the evolution of learning systems from primarily print-based to CMC-based ones in dedicated distance education institutions. First, underlying, dominant behavioural learning theories that are imbedded in the textual processes of traditional, correspondence-based distance education universities can extend to CMC learning environments and act to constrain instructional practice.

Second, the CMC-based learning models undergirding the M.Ed. and M.Comm. programs at Access University are somewhat unique even within the institution. These models increase instructor-student interaction and affect the instructional experiences of the study's participants. These models appear to significantly increase economic costs. As a result, they likely cannot inform the process of wholesale conversion from print-based programs to CMC-based ones at Access University and other similar dedicated distance education institutions, particularly in the larger undergraduate programs. Ongoing tutorial support for both on-line and traditional homestudy students must continue, tuition fees cannot be increased significantly, and higher student-instructor ratios must be maintained to contain instructional costs.

New learning models are therefore needed which encourage unstructured and student-prompted interaction, enable instructors to intervene more selectively in the interactions of participants, and generally provide increased amounts of student support without direct instructor involvement. These organizational issues may provide some of the more significant challenges for distance-based universities as they proceed into the next millennium.

Lessons Learned from the Research Process

Before I began this study, I expected that the descriptions of the participants' experiences would tend to reinforce one another – not in the sense that I would find a great deal of underlying common ground among the descriptions (although I did expect this) but rather that a "naturalistic" process of enquiry in the end would produce important categories of meaning. These categories in turn would provide a rather integrated, rounded and complete account of the overall CMC experience. I also had expected that differences in their accounts might be largely attributable to factors external to the instructors themselves – for instance, differences arising from the various CMC systems used, the subject matter of the course or courses that each instructor taught, or their relative amounts of experience with the medium.

However, I now think that a comprehensive account of the CMC instructional experience may not be possible. It is clearer to me that an in-depth study of various individuals' subjective perceptions cannot constitute an adequate description of a supposedly objective whole. The instructors' descriptions appear to be informed by such different, fundamental beliefs about the nature and purposes of adult and distance education that their descriptions are in many ways irreconcilable. Importantly to me, I also now realize that many of the points of view expressed in the distance education literature were often informed by underlying, unstated beliefs about learning theory which influenced the way CMC is experienced, described and investigated by various writers.

Naturalistic enquiry seemed particularly suited to this study because it enabled me to extensively discuss, probe, and think about individual instructors' accounts of what they do as educators in the CMC environment and to link these experiences to more fundamental considerations, at least on a preliminary basis. Combined with my reading of the literature, the investigative process also prompted me to reflect on organizational issues which have implications for future forms of individual CMC instructional practices and the implementation of CMC-based instructional systems in both traditional classroom-based and dedicated distance education universities. Additional research could explore these issues further. Ideas explored here may also suggest additional perspectives from which to critique extant CMC literature.

The study's findings may have been significantly different if the participating instructors had been enthusiasts who initiated their own CMC-based courses within primarily classroom-based programs. While none of the six instructors could be classified as unwilling CMC users, I believe that the imperative of individual participation that resulted from a larger organizational commitment to adopt CMC as a major means of interaction in the instructors' various distance-based graduate programs allowed me to select and interview those instructors who held a more diverse and critical set of understandings about the nature of electronic, asynchronous interaction. These divergent understandings in turn illuminated issues that eventually emerged as important considerations in this study.

Implications for Practice

The instructors' experiences and my analysis of their accounts suggest several implications for the CMC instructional practice. Most importantly, instructors need to identify or clarify their underlying philosophical perspectives about the primary purposes of adult and distance education when designing on-line courses, since these perspectives largely determine the appropriate instructional goals and techniques to be used in the asynchronous, electronic environment. Instructors should structure their CMC learning environment accordingly. In particular, they need to employ practices that are consistent and supportive of views about the appropriate amount and type of interaction between individual learners and printed materials, individual learners and the instructor, and among learners. For instance if a constructivist perspective is assumed, collaborative learning and other forms of many-to-many group discussion will be seen as relatively more important and should be designed into the course structure.

In addition, the purposes of learning activities and assignments and the predominant form of instructor-student interaction (e.g., one-to-one as opposed to one-to-many forms of electronic communication) should be influenced by these individual perspectives. Where a common electronic instructional system is used throughout a whole program of studies, these systems need to be flexible. They should give instructors enough independence to design their courses according to their individual views about the nature of the adult education process.

Several pragmatic considerations were noted in the study which affect instructional practice. Instructors, in particular novices, need to be aware of the significantly greater amounts of time that CMC instruction generally entails because of the textual nature of interaction, the increased amount of contact that students expect, and on-line marking difficulties, for instance. CMC instructors need to ensure that their supervisors adjust their workloads to recognize the time and effort needed to teach effectively in the electronic environment, and that the learning organization provides adequate technical support for this activity.

Instruction of adults in any medium is challenging. Successful practices appear to be affected by a complex confluence of learners' and instructors' needs and abilities. However, as one instructor in this study noted, it is likely that a wide variety of instructional practices can be successfully incorporated into the CMC environment if learners are treated with respect and genuine concern for their welfare in all phases of the educational process.

Recommendations for Future Research

The findings of this study suggest several areas for future research which could be conducted as either naturalistic enquiry within a constructivist paradigm or as rationalistic research. First, the influence of educational philosophy on instructional practice in the CMC environment needs to be studied further. Second, variations in practices of relatively inexperienced and more experienced CMC instructors could provide additional insight into the way that instruction is conducted in this environment and the instructional skills that are developed as instructors interact electronically with students.

In this study, computer conference transcripts were not particularly helpful in the study of instructors' experiences. A third avenue for future research could therefore involve observation of and dialogue with instructors as they participate in on-line sessions. These methods may provide more useful information regarding particular thought process and perceptions that inform instructional practices. Finally, the economic implications of providing widespread on-line instruction at dedicated distance education institutions need to be explored further.

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APPENDIX A

Instructor Consent Form

Dear Instructor X:

Re. Consent to Participate in a Study of Instructor Experiences in Computer Conferences

This letter seeks your formal consent to participate in the above-noted study. I am an Ed.D. student in the Department of Educational Policy Studies, Faculty of Education at the University of Alberta. As part of the degree requirements, I must conduct a research project and submit the results to a supervising committee which is chaired by Dr. Margaret Haughey.

In this study, I plan to describe instructors' experiences in university-level computer conferences. Among other issues, I am interested in what strategies instructors use to enhance student learning experiences at a distance, strategies instructors use to control or guide interaction, the effect of computer conferences on teaching styles, how instructors gain understanding of the computer conferencing environment and assist their students in doing the same, and how instructors perceive computer conferencing workload requirements compared to other, more traditional teaching duties.

This type of study appears to be somewhat unique. I hope that your involvement will be rewarding for you. As indicated to you earlier, I plan to interview you on two separate occasions, about six weeks apart, at a mutually convenient time and location. The interviews should last approximately ninety minutes each. I will provide you with a general outline of my areas of research interest, but the interviews themselves will be unstructured and seek primarily to record your experiences with and understandings of computer conferences. These activities will likely take place between April 1 and May 31, 1996. I also plan to analyze transcripts of portions of computer conferences which you have participated in, subject to appropriate approval.

I do not anticipate any risks to you as a result of participating in this study. You will receive a copy of your interview transcripts to allow you to check and approve the contents. If I do not receive a response from you within a specified period of time, I will assume that you approve of the transcript contents.

Any information that may link the discussion to you will be disguised. You may exercise your right of veto over or clarification of any portion of your interview transcripts. The interview tapes will not be used by anyone else, and will be destroyed upon completion of the study.

You will also be provided with a summary of the study's initial findings for your review. Certain references in the summary, particularly names of the interviewees, will be altered to maintain anonymity. Pseudonyms will be used for direct quotes where necessary, and findings will be aggregated in categories of data to also prevent identification of individual participants.

You may withdraw from the study at any time by contacting me at the above-noted address or phone number. Please acknowledge your consent by signing this letter and returning one copy to me. The other copy is for your records. Thank you for agreeing to participate in this study.